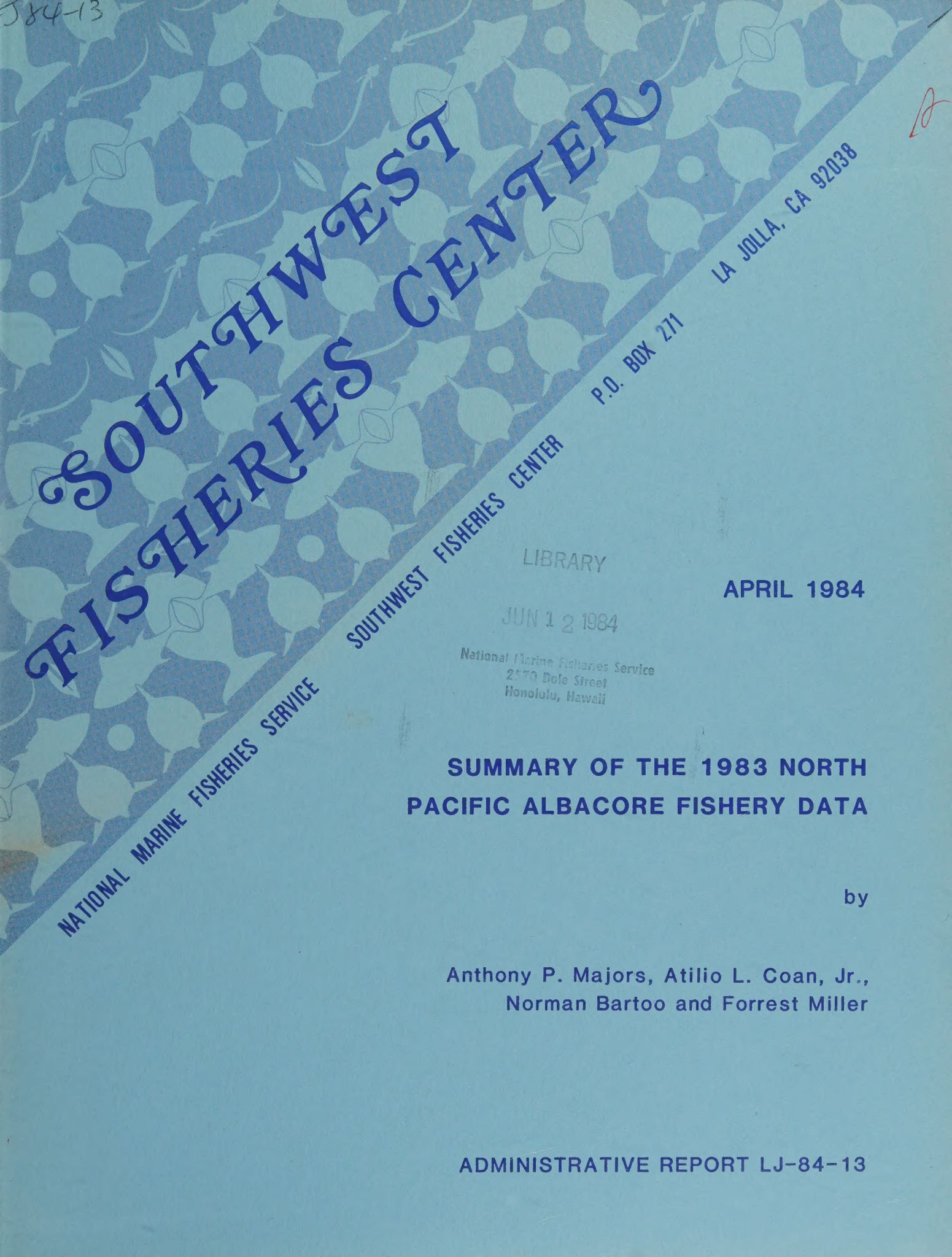


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SUMMARY OF THE 1983 NORTH PACIFIC ALBACORE FISHERY DATA

by

Anthony P. Majors, Atilio L. Coan, Jr.,
Norman Bartoo and Forrest Miller

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SUMMARY OF THE 1983
NORTH PACIFIC ALBACORE FISHERY DATA

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SUMMARY OF THE 1984 NORTH PACIFIC ALBACORE FISHERY DATA

INTRODUCTION

This report marks the 10th successive year of a cooperative data collection effort on the United States (U.S.) North Pacific albacore fishery. Over 800 logbooks were distributed to fishermen in early 1983 (March-April), and during the albacore fishing season (June-September) at unloading docks. Captains and fishermen recorded albacore catch and effort information in the logbooks and submitted them to samplers employed by state fisheries agencies. In the cases where fishermen did not have logbooks, samplers conducted interviews for the required information. These samplers also measured and collected length-frequency samples of the unloaded catch. Cooperating groups involved in the distribution of logbooks and the collection of data include California Department of Fish and Game, Oregon Department of Fish and Wildlife, Washington Department of Fisheries, Pacific Marine Fisheries Commission and Western Fishboat Owners Association.

The purpose of this report is to present data collected from the 1983 U.S. North Pacific albacore fishery. Areas covered include the traditional fishing grounds off the U.S. west coast, areas north of Hawaii and areas around Midway Island. Data are summarized and compared with those collected in 1982. Catch data from foreign fisheries including Canada, Japan, and Taiwan from 1952 to 1981 are also included for comparison purposes.

SAMPLING COVERAGE

Sampling coverage for the United States North Pacific albacore fishery in 1982 was measured as the ratio of the number of sampled vessel trips to the total number of vessel trips. For the 1983 fishing season, total vessel trips were unavailable, especially for vessel landings in California. Therefore, sampling coverage for 1982 and 1983, as used in this report, was measured as the ratio of sampled landings in weight to total landings in weight.

During the 1983 U.S. North Pacific albacore fishing season, an estimated 22,313,767 pounds (10,119 metric tons) of albacore were landed at ports throughout California, Hawaii, Oregon and Washington. Of this total, approximately 35% (7,866,362 lbs) were sampled for catch and effort (information collected from voluntary logbooks and interviews), and 3% (636,090 lbs) were

sampled for length-frequency. Catch and effort coverage, as estimated from sampled landings in weight, dropped 13% from the 48% coverage rates in 1982 to the 35% in 1983. Coverage for length-frequency for both years remains the same at 3%. However, since the total weight of albacore landed in 1983 was 43% higher than in 1982, the estimated number of pounds sampled showed a slight increase of 4% for catch and effort, and 52% increase for length-frequency. The following table gives the sampling coverage by state and year.

SAMPLING COVERAGE : 1983

State	Total Landings in Pounds	Landings in Pounds Sampled	Percent Coverage	Vessel Landings Sampled	Ave. Landings in Pounds Per Vessel
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Catch and Effort:

California	16,342,942	3,855,936	24%	391	9861
Hawaii	1,411,766	1,127,014	80%	25	45080
Oregon	3,409,739	2,163,910	63%	276	7840
Washington	1,149,320	719,502	63%	103	6985
Total	22,313,767	7,866,362	35%	795	9894

Length Frequency:

California	16,342,942	331,324	2%	435	-
Hawaii	1,411,766	24,066	2%	47	-
Oregon	3,409,739	188,986	6%	109	-
Washington	1,149,320	91,714	8%	43	-
Total	22,313,767	636,090	3%	634	-

SAMPLING COVERAGE : 1982

State	Total Landings in Pounds in Pounds	Landing in Pounds Sampled	Percent Coverage	Vessel Landings Sampled	Ave. Landings in Pounds Per Vessel
-------	--	---------------------------------	---------------------	-------------------------------	--

Catch and Effort:

California	9,439,111	3,479,971	37%	253	13755
Hawaii	3,716,000	2,813,449	76%	51	55165
Oregon	1,898,752	840,913	44%	107	7859
Washington	572,000	407,493	71%	41	9938
Total	15,625,863	7,541,826	48%	452	16685

Length Frequency:

California	9,439,111	201,260	2%	248	-
Hawaii	3,716,000	69,962	2%	72	-
Oregon	1,898,752	89,508	5%	43	-
Washington	572,000	56,738	10%	32	-
Total	15,625,863	417,468	3%	395	-

In both years, the sampling coverage for catch and effort in Hawaii was higher than that of California, Oregon or Washington. All landings in Hawaii were unloaded at one location so that sampling was easier and more effective than in the other three states. In addition, the average landing for each jigboat that fished in areas north of Hawaii and around Midway Island was larger. These larger size vessels entered the fishery early in April and spent longer periods fishing. The average weight of landing per vessel unloaded from these jigboats was 45,080 lbs. in 1983, and 55,165 lbs. in 1982. In both years, California had the lowest sampling coverage of catch and effort among the four states. Approximately 73% of the U. S. albacore total catch for the year in weight was landed in this state in 1983, and 60% in 1982. This may have caused the lower sampling coverage since sampling effort was distributed according to normal historical landing patterns. As in 1982, an unknown amount of albacore was sold frozen-fresh to the public in 1983, so that amount did not enter the normal sampling areas.

CATCH

Total reported catch for the U.S. North Pacific albacore fishery for 1983 was 22,313,767 pounds (10,119 metric tons). This represents a 43% increase from the 15,625,863 pounds (7,086 metric tons) recorded for 1982 (Table 1, Figure 1). Catch data from foreign fisheries for 1983 are not yet available. However, charts of catch areas (latest data available) from the four major fisheries were presented to show the areas fished (Figure 2).

The U.S. albacore surface fleet in 1982 and 1983 fished extensively in areas west of 140 degrees west longitude from April to August (Figure 3). The fishery was arbitrarily divided into two areas: (1) the inshore area, from the U.S. coastline to 140 degrees west longitude, and (2) the offshore area, west of 140 degrees west longitude.

The albacore fishing season in 1983, like that in 1982, started early off southern California during the month of April in areas west of Erben bank. In 1983, the fishing season came to a close in inshore areas off southern California in November. In 1982, it closed earlier off these same areas during the month of October. Offshore fishing in 1983 lasted through the first 15 days in September. Fishing in the offshore areas in 1982 continued strong through the month of September and gradually came to a close in mid-October.

Although distribution of catches in the offshore and inshore areas in 1983 was very similar to those in 1982, there were significant differences between the 1983 and 1982 albacore fishing seasons. There was a 67% increase in the inshore catch and a 36% decrease in the offshore catch for 1983 compared with the catches in those areas for 1982. In 1982, the inshore catch was 43% of the total catch, and the offshore catch was 57%. In 1983, the inshore catch was 65% of the total catch, and offshore catch was 35%. This increased catch in the inshore area for 1983 was due to increased catches in the inshore areas north of 40 degrees north latitude where over 58% of the inshore catch was taken. The area inshore and south of 35 degrees north latitude, which was very productive in 1982, was less productive throughout the season in 1983 (Figure 3).

EFFORT

Total sampled effort (days fished) for the 1983 and 1982 fishing seasons were basically the same. There was only a slight increase of 7% from the reported 7,838 days fished in 1983, to the 7,316 in 1982. In 1983, 75% of the effort (5,888 days fished) spent in the inshore area yielded 65% of the sampled

catch (5,201,826 lbs.), while in 1982, 55% of the effort (4,147 days fished) spent in this same area yielded 41% (3,038,968 lbs.). In 1983, 25% of the effort (1,861 days fished) spent in the offshore area yielded 35% of the sampled catch (2,758,672 lbs.), while in 1982, 45% of the effort (3,169 days fished) spent in this same area yielded 59% (4,433,099 lbs.). In addition to the success of the fishery in the inshore area for 1983, the number of standard-size jigboats (45-foot) participating in the fishery during the season increased by 48% over those participating in the 1982 fishery (Figure 4).

CATCH-PER-UNIT EFFORT (CPUE)

We expressed catch-per-unit effort (CPUE) for the North Pacific albacore in numbers of fish caught per day's fished for a hypothetical 45-foot (14-meter) jigboat. This makes possible a comparison between areas and fishing years without having to additionally consider vessel size. This adjustment was required because some vessel size classes such as 40 to 49-foot (12 to 15-meter), inclusive, (the average size vessel in the 1983 fishery) caught less fish in an average day's fishing than did vessels in the 50 to 55-foot (15 to 18-meter) size class. A single day's fishing for a small vessel was equivalent to less than a day's fishing for a 50 to 59-foot (15 to 18-meter) vessel. The following table lists catch (in numbers of fish), standardized effort (days fished) and CPUEs of the most productive time periods from July to September for 1982 and 1983.

Months:	July		August		September	
Time Period:	1 - 15	16 - 31	1 - 15	16 - 31	1 - 15	16 - 30
1982						
Catch:	12,299	92,519	116,230	142,971	38,540	17,211
Effort:	438	1,574	1,440	1,911	501	165
CPUE:	28	59	81	75	77	104
1983						
Catch:	13,382	92,053	118,589	120,711	81,326	35,626
Effort:	201	1,267	1,234	934	890	686
CPUE:	67	73	96	129	91	52

Annual estimated standardized CPUE, in numbers of fish per day's fishing for a standard 45-foot (14-meter) jigboat, increased from 62 fish per day in 1982 to 88 fish per day in 1983 (Figure 5). Estimates of CPUE for 1983, like those for 1982, were highest during the month of August (Figure 6). High catch rate recorded for the last 15 days in September 1982 was reported in areas inshore and southwest of San Francisco. Catch rate of 52 fish per day for a 45-foot (14-meter) vessel in 1983, although normal for this time period in the season, was considerably less than the 104 fish per day recorded for the same time period in 1982 (above table).

In 1983, there were three times as many 1-degree squares with CPUEs greater than 200 fish per day than in 1982. Like 1982, the majority of the 1-degree squares with CPUEs greater than 200 were located in the offshore area. However, unlike 1982, these 1-degree squares with high CPUEs for 1983 were predominantly located south of 40 degrees north latitude.

LENGTH FREQUENCY

The majority of length-frequency samples (95%) of the 1983 U. S. North Pacific albacore catch, were taken from jigboats. From these jigboats, approximately 89% of the samples were taken from the inshore catch. Only 3% of the sampled fish represented baitboats, and 2% were taken off vessels using both jig and bait (Figure 7).

The average length of albacore measured in 1983 was 66.2 centimeters (cm) in fork length (tip of nose to fork of tail). This was very similar to the 66.8 cm fork length recorded for 1982. Most of the albacore caught inshore and north of 40 degrees north latitude for 1983 and 1982 were between 60 and 66 cm in length. Most of the albacore caught by the larger jigboats offshore in 1983 were between 60 and 66 cm., and were smaller than the 74 to 80 cm fish reported from this area in 1982. The area inshore and south of 40 degrees north latitude for 1983 showed an increased catch of fish between 74 and 80 cm in length. These larger fish represented the majority of catches by baitboats and vessels using both jig and bait.

SEA-SURFACE TEMPERATURE

Sea-surface temperature (SST) from commercial transport vessels, fishing boats, and research vessels were compiled by computer and organized into monthly mean charts with 1-degree quadrangle resolution. These charts provided useful information for locating and monitoring regions of relatively cold or warm

water and surface ocean fronts (Figure 8). During 1983 El Niño (warm water) conditions prevailed over most of the traditional albacore fishing grounds (areas east of 140 degrees west longitude). From areas off Baja to the Gulf of Alaska, SSTs were 1.0 to 2.0 degrees C (1.8 to 3.6 degrees F) above normal throughout 1983, and extended to areas several hundred miles from the coast. During July and August in 1983, coastal areas off northern California and Oregon had SSTs more than 3.0 degrees C (5.4 degrees F) above normal. In contrast, SSTs were 2.0 to 3.0 degrees C (3.6 to 5.4 degrees F) below normal west of 140 degrees west longitude and south of 40 degrees north latitude during the albacore season. The persistent large positive anomalies along the U. S. west coast and the large negative anomalies offshore were due, in part, to the westward displacement of the eastern Pacific high pressure center during El Niño of 1982-1983. As a result, the 1983 summer coastal winds were often weaker than normal and, except for August to October, coastal upwelling was unusually weak. Thus, ocean surface frontal boundaries (temperature edges) were frequently weak and transient. Late in the albacore season, the best temperature fronts were usually found inshore (within 200 miles of the U. S. west coast), particularly in areas north of 40 degrees north latitude. Some good SST fronts were also found in areas south and west of Point Conception.

DISCUSSION

The albacore fishing in 1983, like the fishing in 1982, started early in April when jigboats leaving for areas north of Hawaii and around Midway Island reported catches west of Erben Bank. The average size of albacore caught in 1983 was 66.2 cm in length (14.0 pounds) which was very similar to the 1982 average size of 66.8 cm (14.5 pounds). Major observed differences between the 1983 and 1982 fishing seasons included: 1) the fleet spent more time and experienced higher catches in the inshore areas, especially those north of 40 degrees north latitude, 2) the total catch increased 43%, 3) there was a 48% increase in participation of the standard-size vessel (45-foot) in the fishery, and 4) SSTs offshore were below normal and inshore temperatures were above normal during the albacore fishing season. Increased participation of smaller size vessels (40 to 49-foot), and well developed temperature fronts in inshore areas, particularly in areas north of 40 degrees north latitude, may have contributed to higher catch in 1983.

Table 1. Catches for North Pacific albacore in metric tons, 1952-1983.

Year	Japan		Taiwan		United States			Canada	
	Pole-and-line	Gill-net	Longline	Total	Baitboat	Jigboat	Sport	Total	Jigboat
1952	41,386	26,687		68,710		23,843	1,373	25,216	71
1953	32,921	27,777		60,830		15,740	171	15,911	5
1954	28,069	20,958		49,065		12,246	147	12,393	
1955	24,236	16,277		40,649		13,264	577	13,841	
1956	42,810	14,341		57,208		18,751	482	19,233	17
1957	49,500	21,053		70,704		21,165	304	21,469	8
1958	22,175	18,452		40,731		14,855	48	14,903	74
1959	14,252	15,502		30,121		20,990	0	20,990	212
1960	23,156	17,369		42,601		20,100	557	20,657	5
1961	18,636	17,437		36,341		12,054	1,355	16,246	4
1962	8,729	15,764		24,684		19,753	1,681	22,519	1
1963	26,420	13,464		40,102		25,142	1,161	28,735	5
1964	23,858	15,458		39,635		18,389	824	22,624	3
1965	41,491	13,701		55,313		16,461	731	17,609	15
1966	22,830	25,050		48,465		1,600	588	17,357	44
1967	30,481	28,869		59,870		4,113	707	22,634	161
1968	16,597	23,961		41,667		4,906	951	26,298	1,028
1969	32,107	18,006		51,593		2,996	358	22,180	1,365
1970	24,376	15,372		40,704		4,416	822	26,277	354
1971	53,198	11,035		65,495		2,071	1,175	25,442	1,587
1972	60,762	12,649		74,333		3,750	637	27,987	3,558
1973	69,811	15,059		87,792		2,236	84	17,972	1,270
1974	73,576	13,053		87,918		4,777	94	25,048	1,207
1975	52,157	10,060		62,785		3,243	640	22,809	101
1976	85,336	15,896		103,696		2,700	713	19,724	252
1977	31,934	15,737		49,398		1,497	537	12,046	53
1978	59,877	13,061		80,176		950	810	17,451	23
1979	44,662	14,249		63,047		303	74	6,630	289
1980	46,743	14,660		65,905		382	168	8,149	212
1981	26,000	-		-		784	195	13,259	200
1982	-	-		-		425	-	7,086	1
1983	-	-		-		607	87	10,119	115

Remarks:

- Figures for 1981-83 are preliminary.
- Japanese longline catches for 1952-60 exclude minor amounts taken by vessels under 20 gross tons. Longline catches in weight are estimated by multiplying annual number of fish caught by average weight statistics.
- Japanese pole-and-line catches include catches by research vessels.
- United States jigboat catches include minor amounts taken by baitboats not submitting logbooks.
- Jigboat catches for years 1952-60 include baitboat catches.
- United States sport catch is a minimum estimate based on partial coverage.
- Grand totals omit unknown but minor catches by longline and pole-and-line vessels of the Republic of Korea.

TOTAL CATCH BY FISHERY

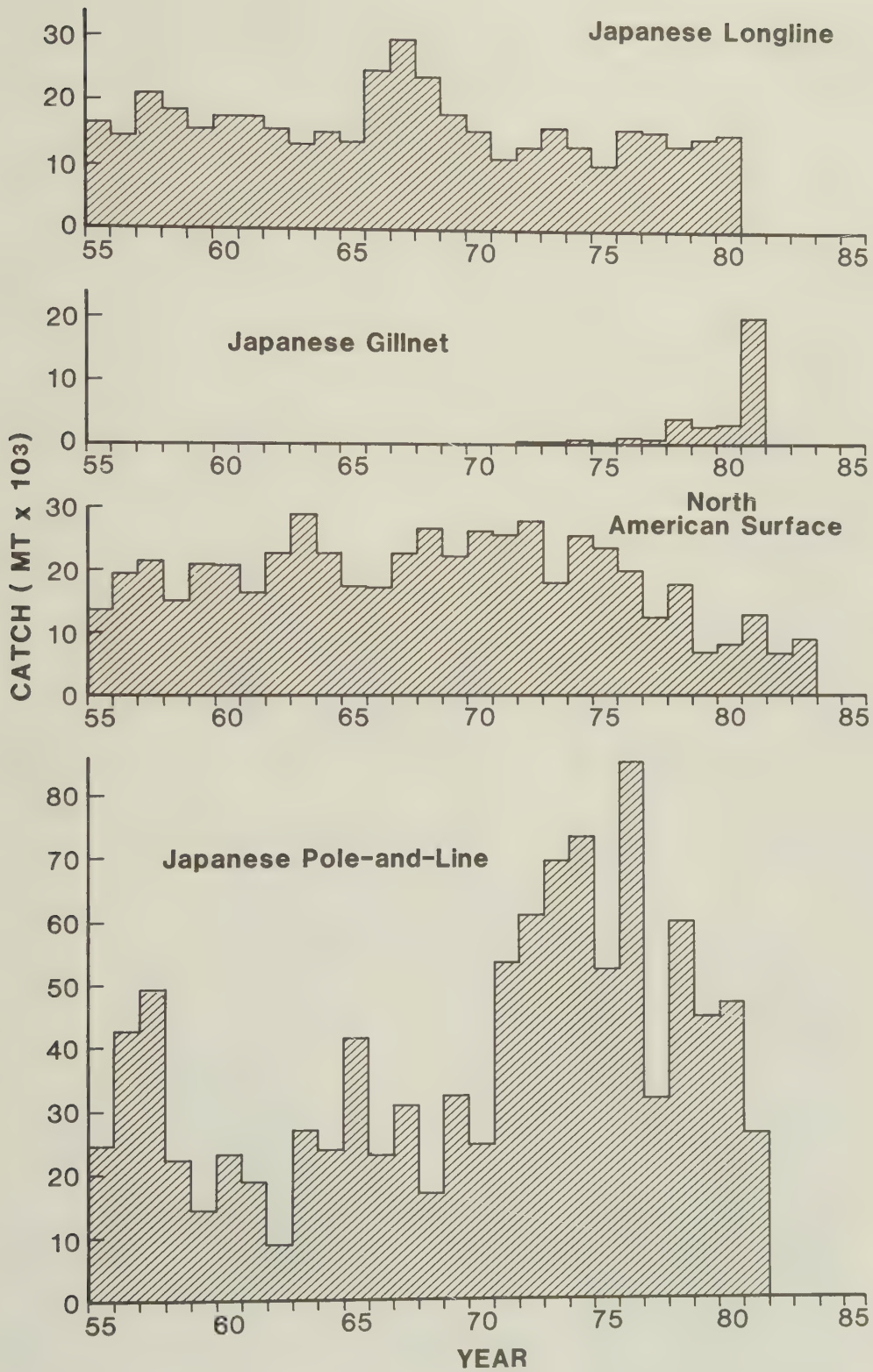


Figure 1. Total catch (metric tons) by fishery and gear

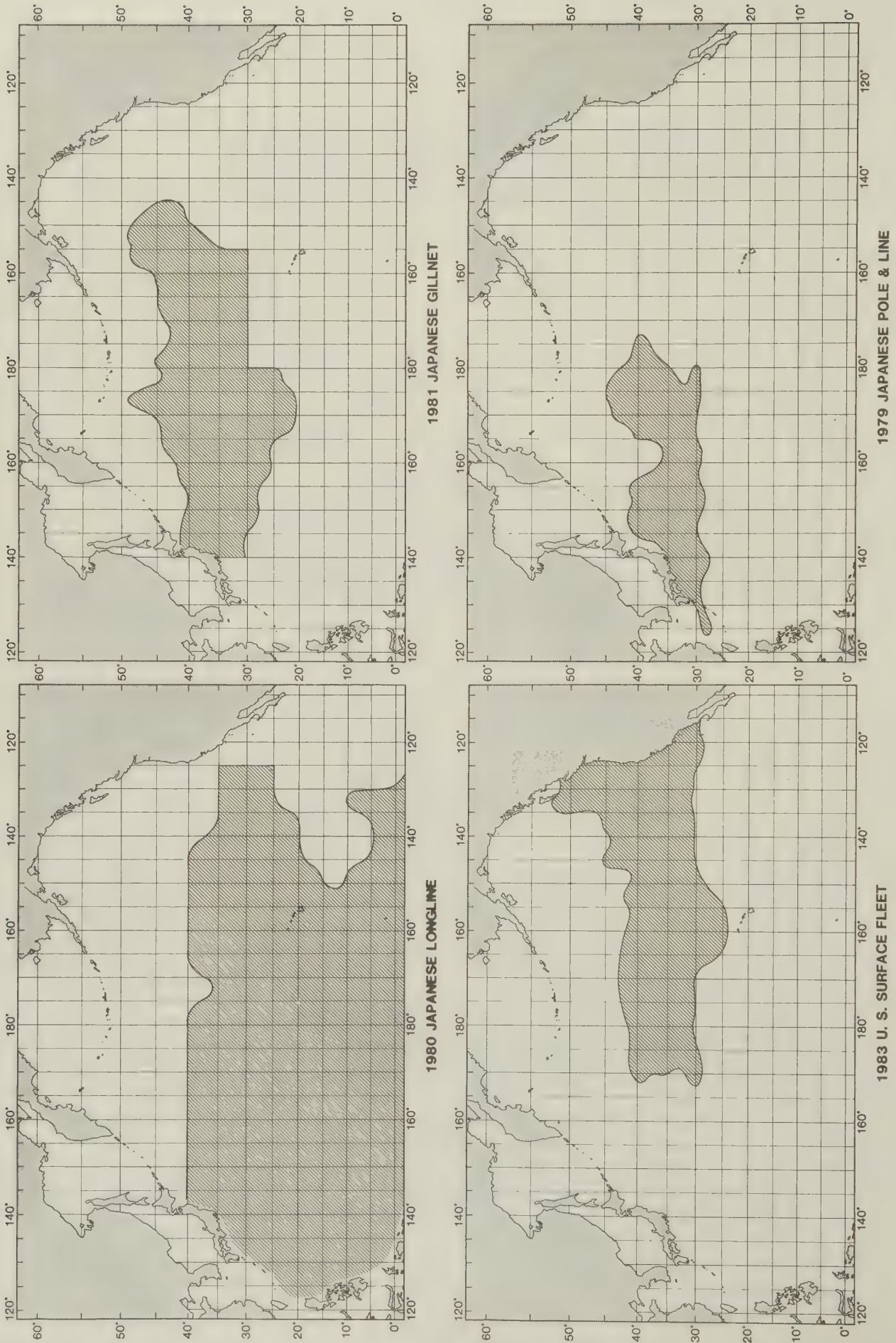


Figure 2. Catch areas of the four major fisheries for North Pacific albacore.

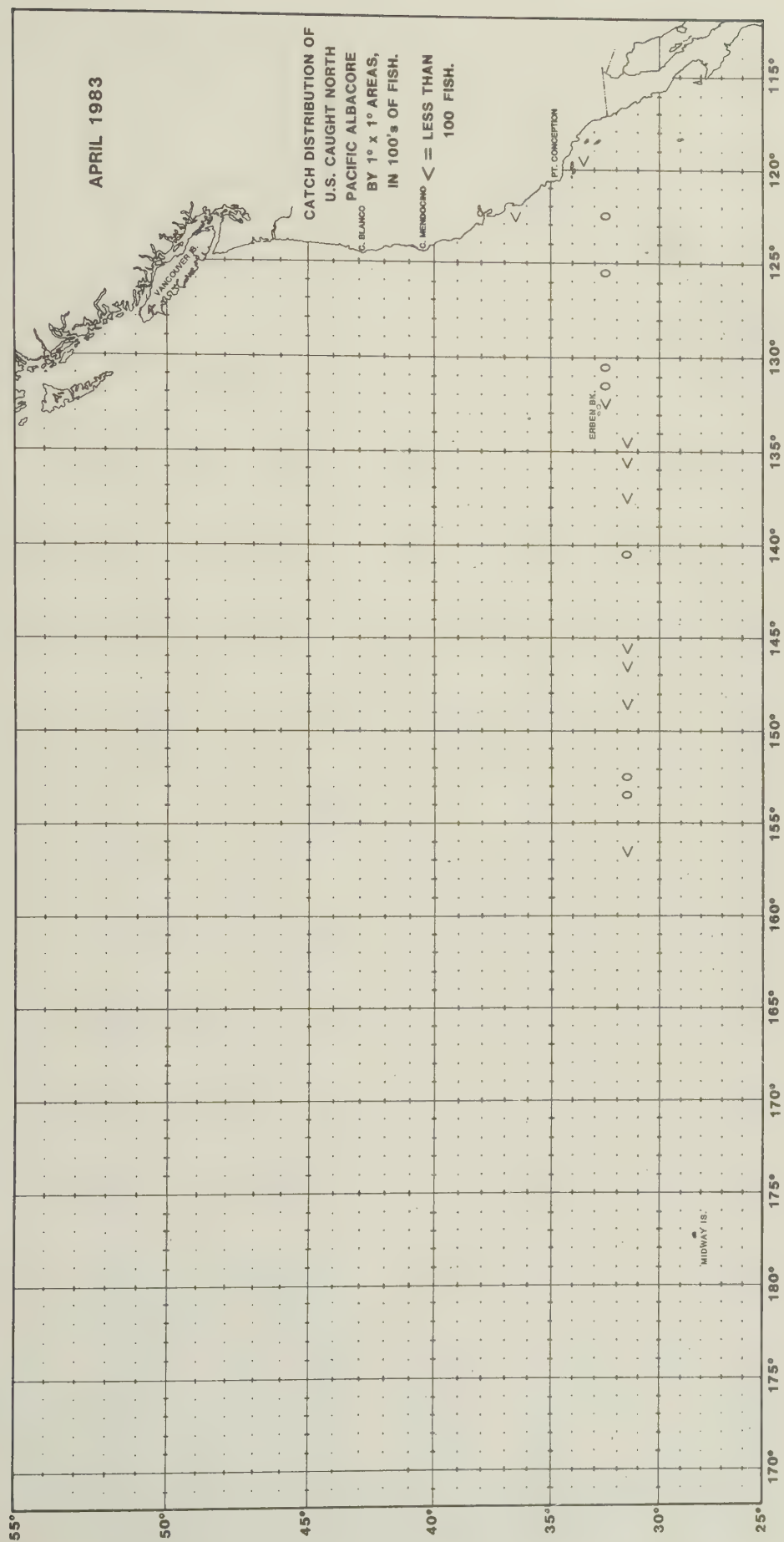


Figure 3a. Combined jigboat and baitboat fishery catches (in numbers of fish) by 1-degree square area, April 1983.

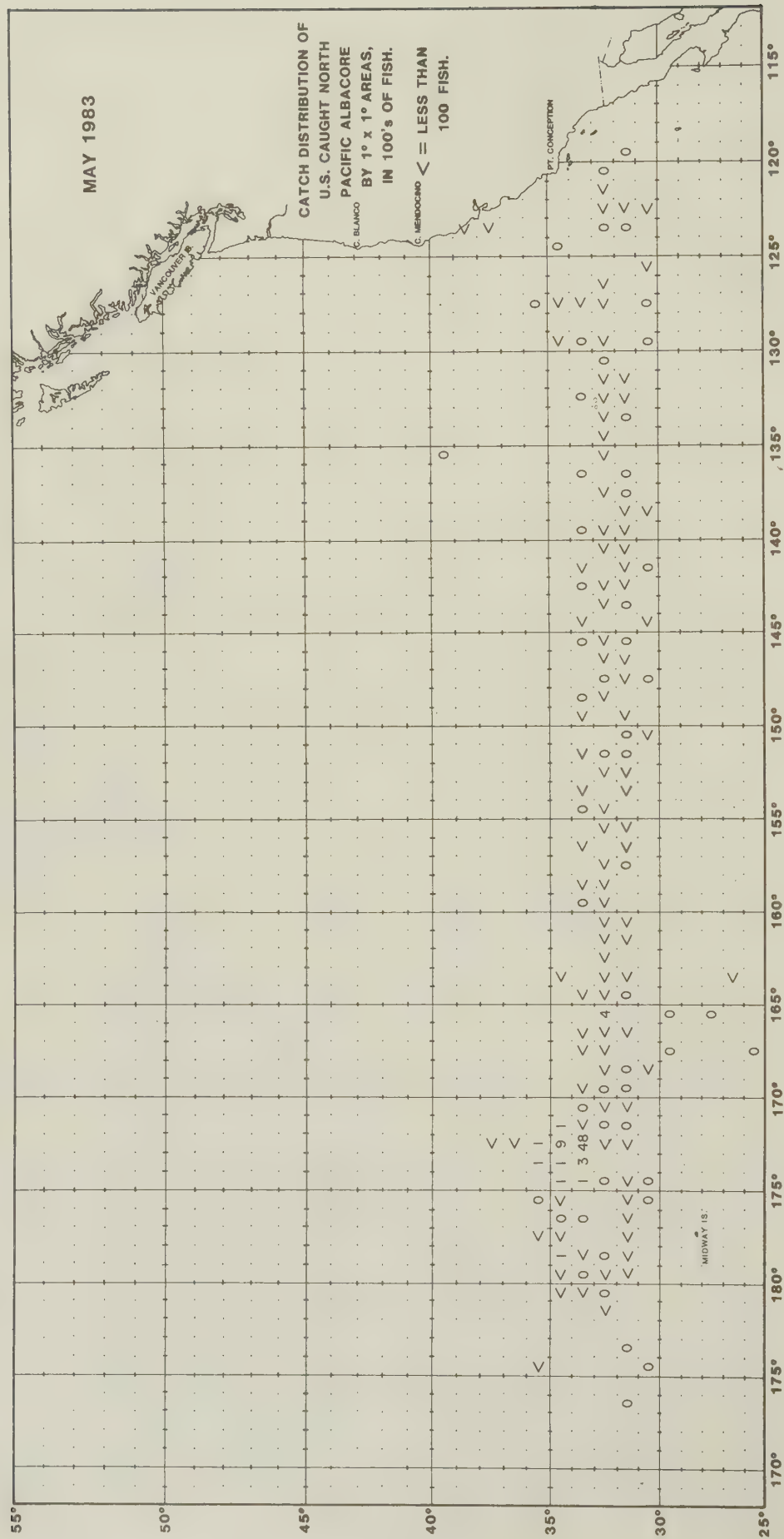


Figure 3b. Combined jigboat and baitboat fishery catches (in numbers of fish) by 1-degree square area, May 1983.

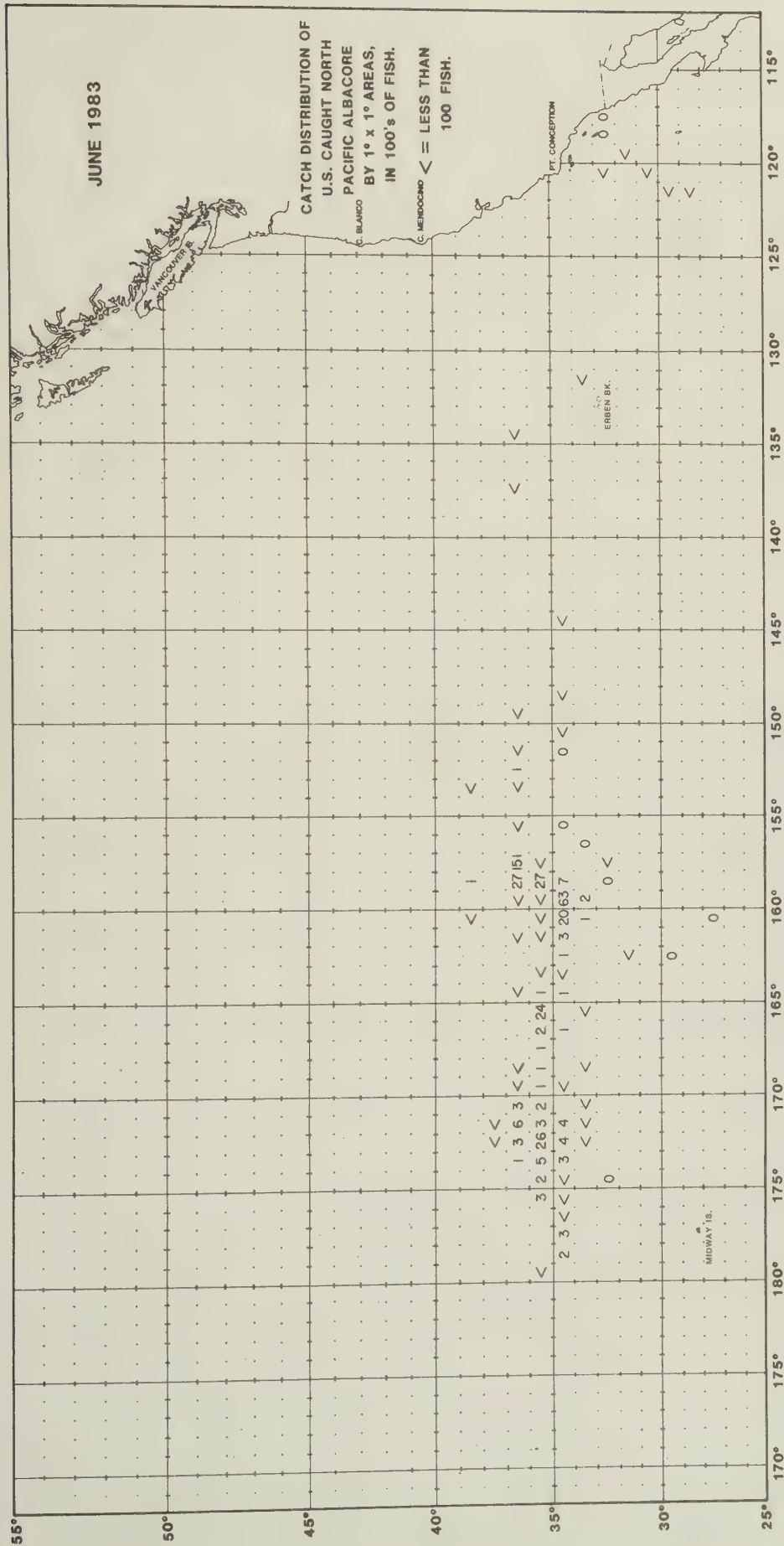


Figure 3c. Combined jigboat and baitboat fishery catches (in numbers of fish) by 1-degree square area, June 1983.

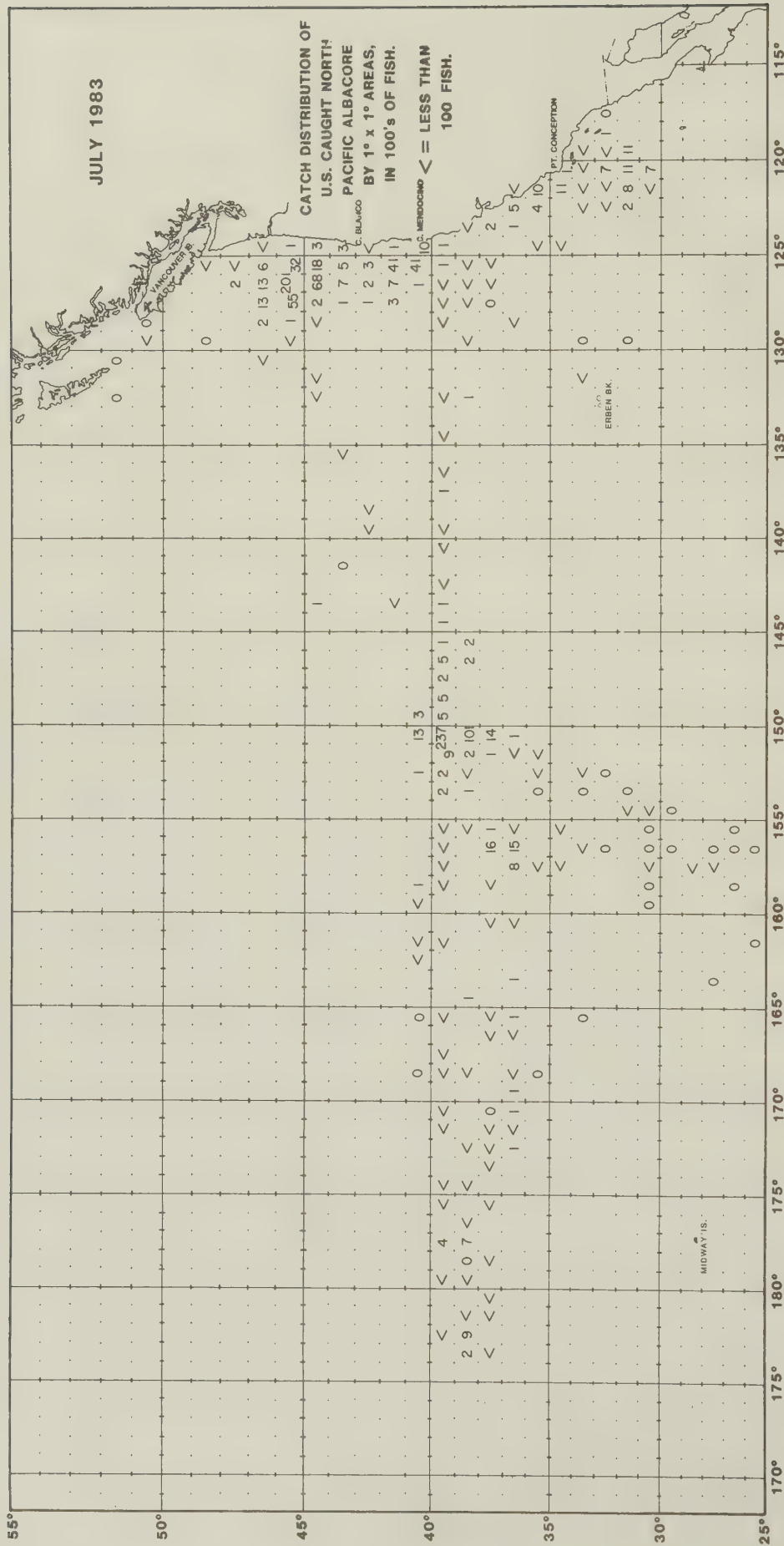


Figure 3d. Combined jigboat and baitboat fishery catches (in numbers of fish) by 1-degree square area, July 1983.

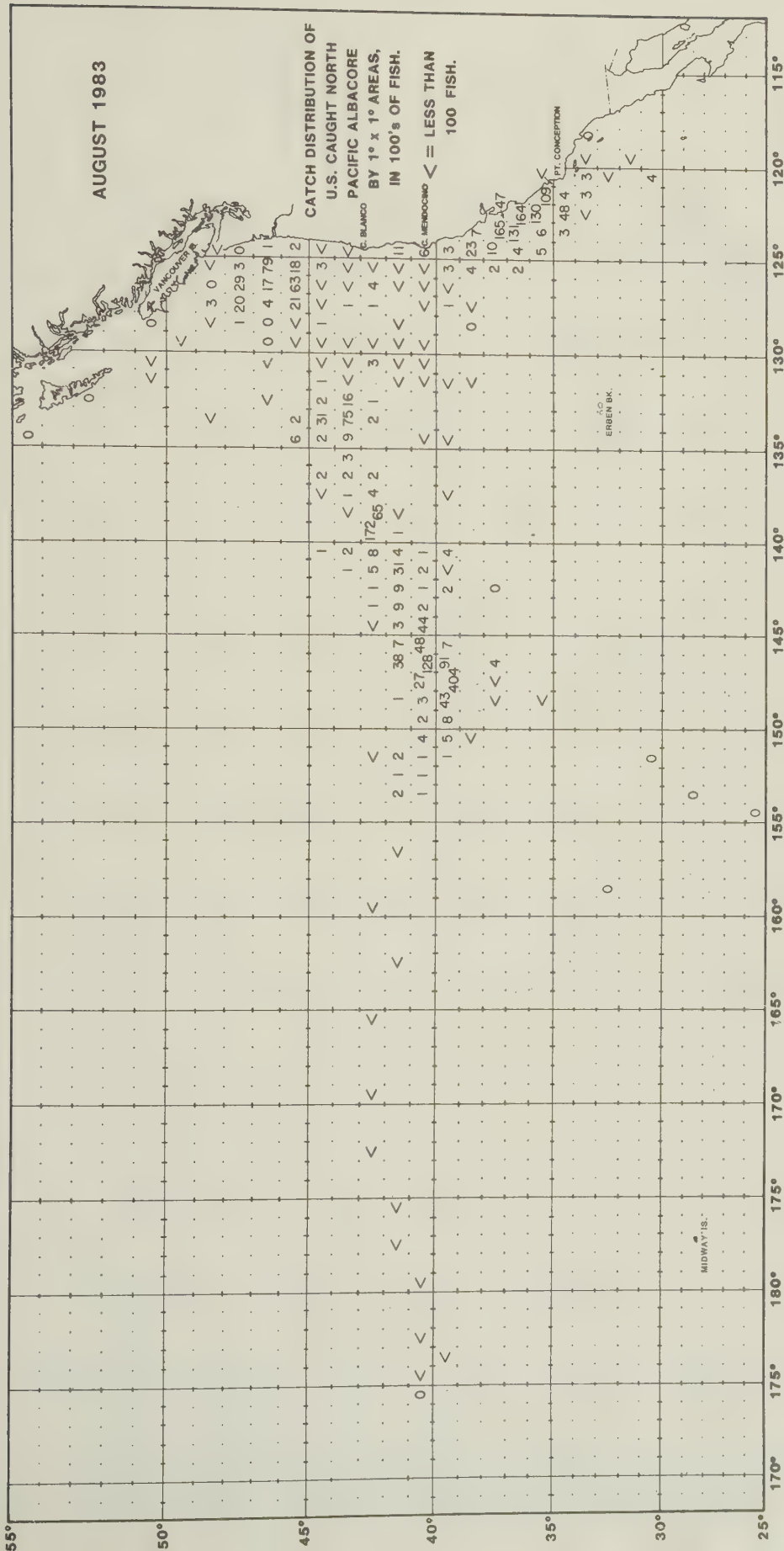
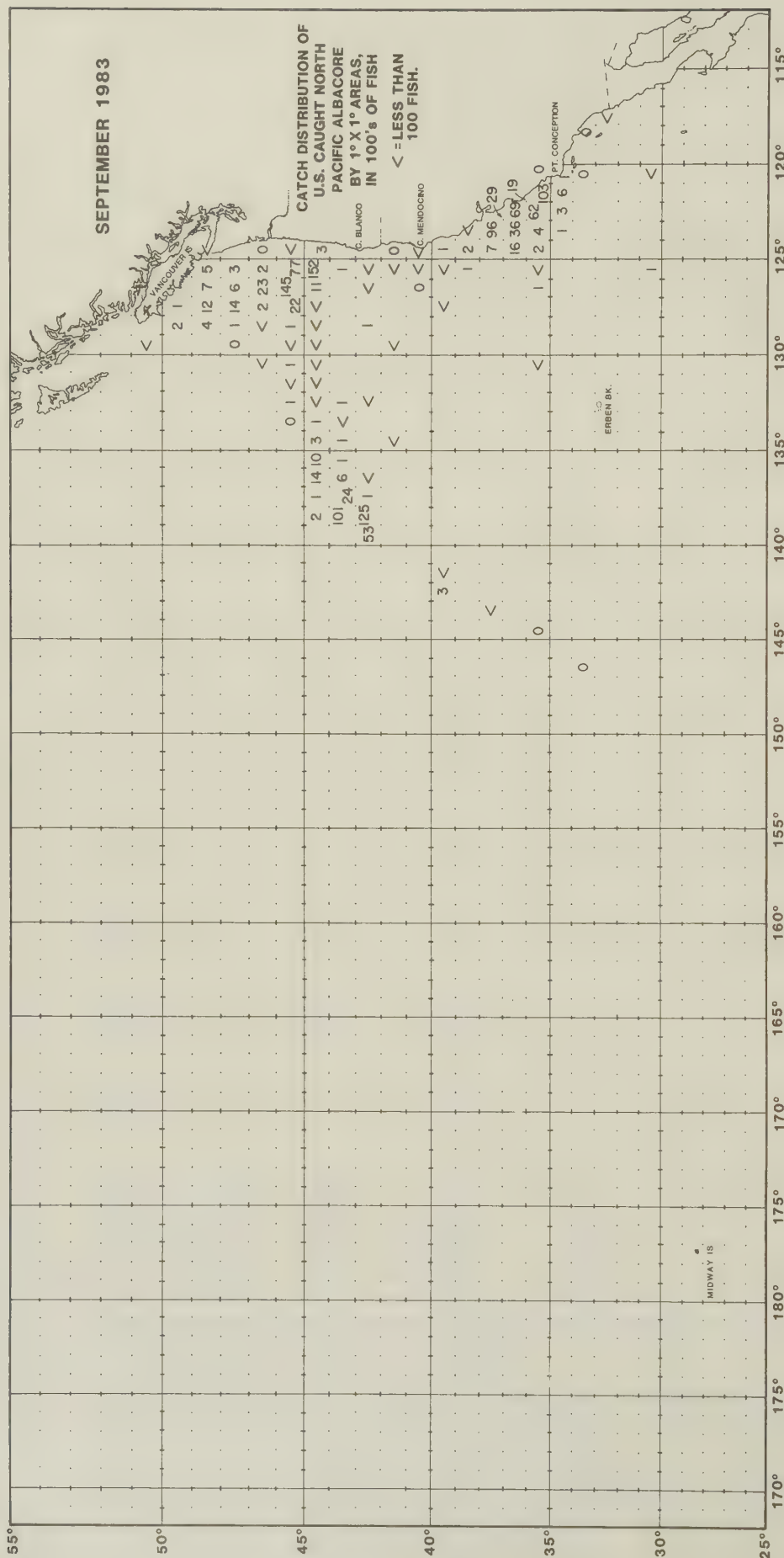


Figure 3e. Combined jigboat and baitboat fishery catches (in numbers of fish) by 1-degree square area, August 1983.



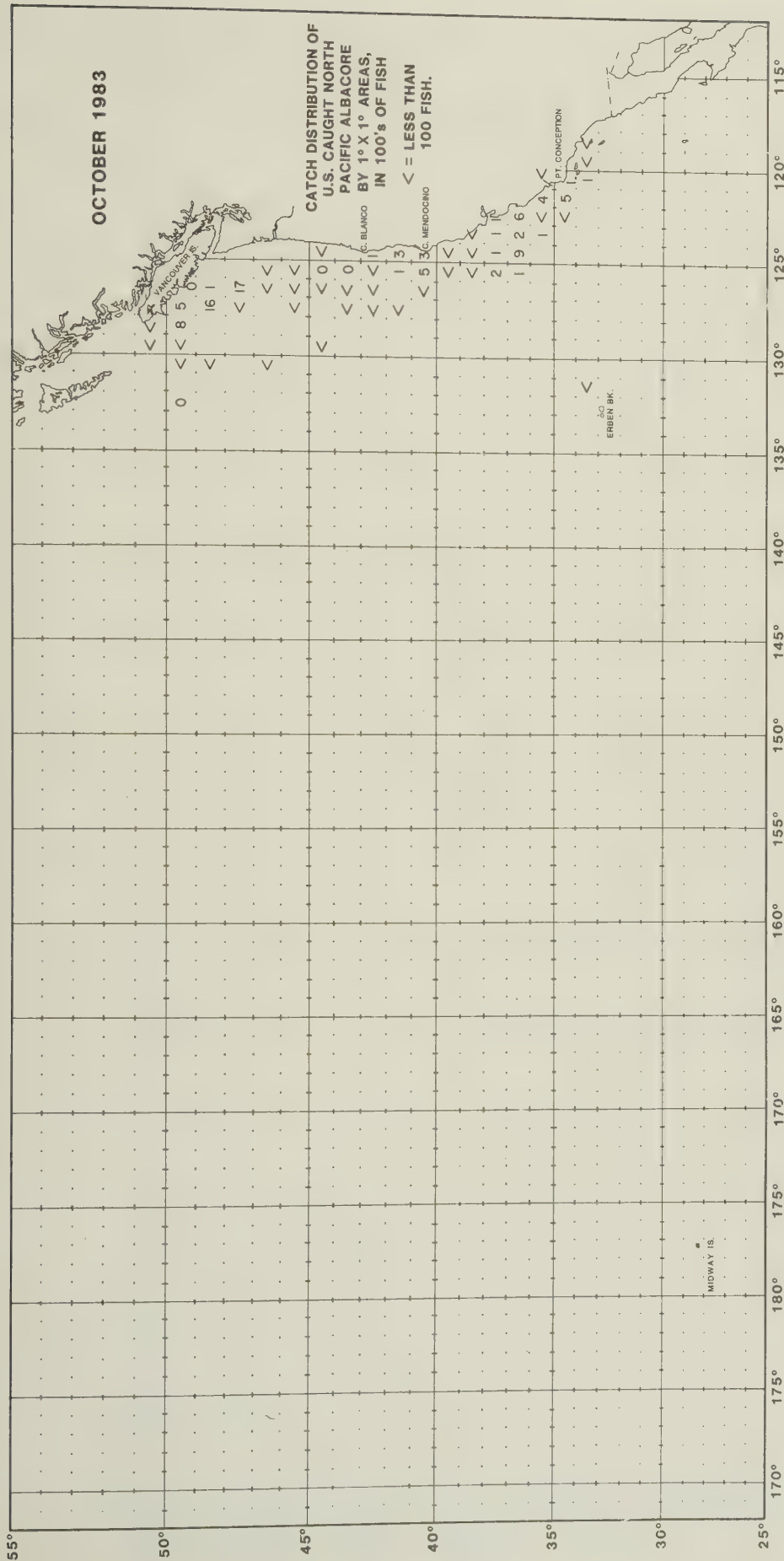


Figure 3g. Combined jigboat and baitboat fishery catches (in numbers of fish) by 1-degree square area, October 1983.



Figure 3h. Combined jigboat and baitboat fishery catches (in numbers of fish) by 1-degree square area, November 1983.

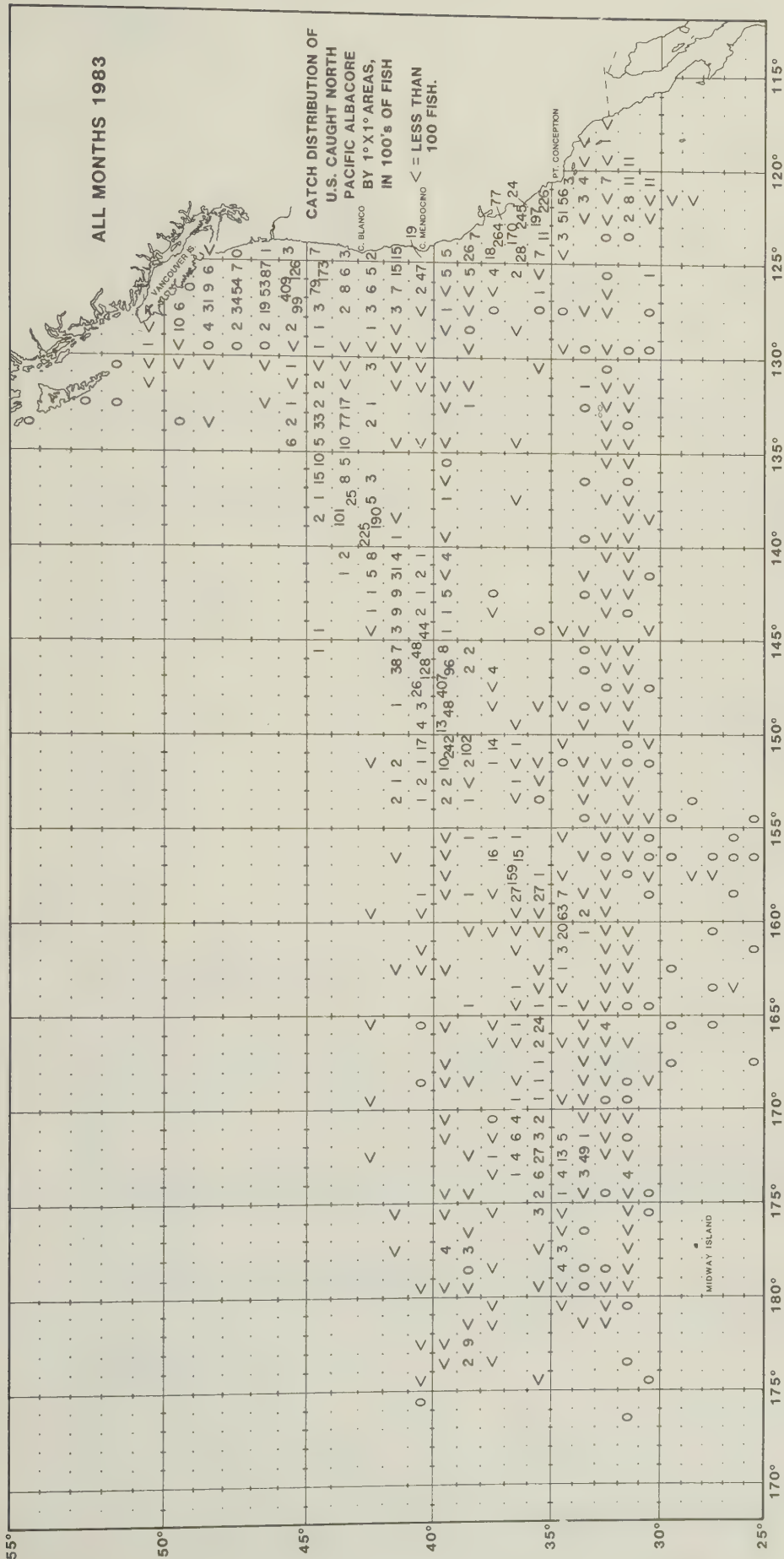


Figure 3i. Combined jigboat and baitboat fishery catches (in numbers of fish) by 1-degree square area, all months 1983.

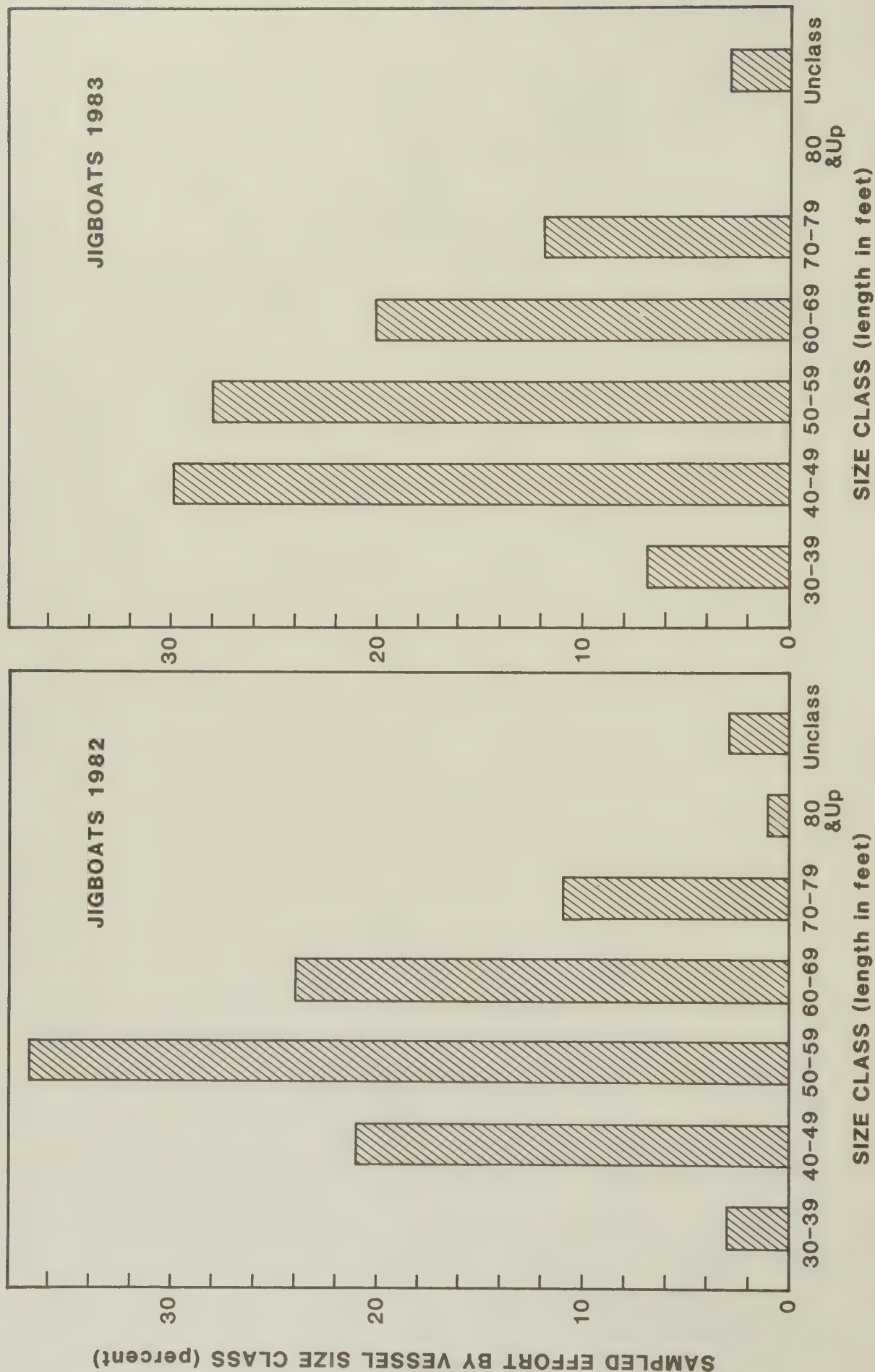


Figure 4. Sampled effort by vessel size class (jigboats) and year.

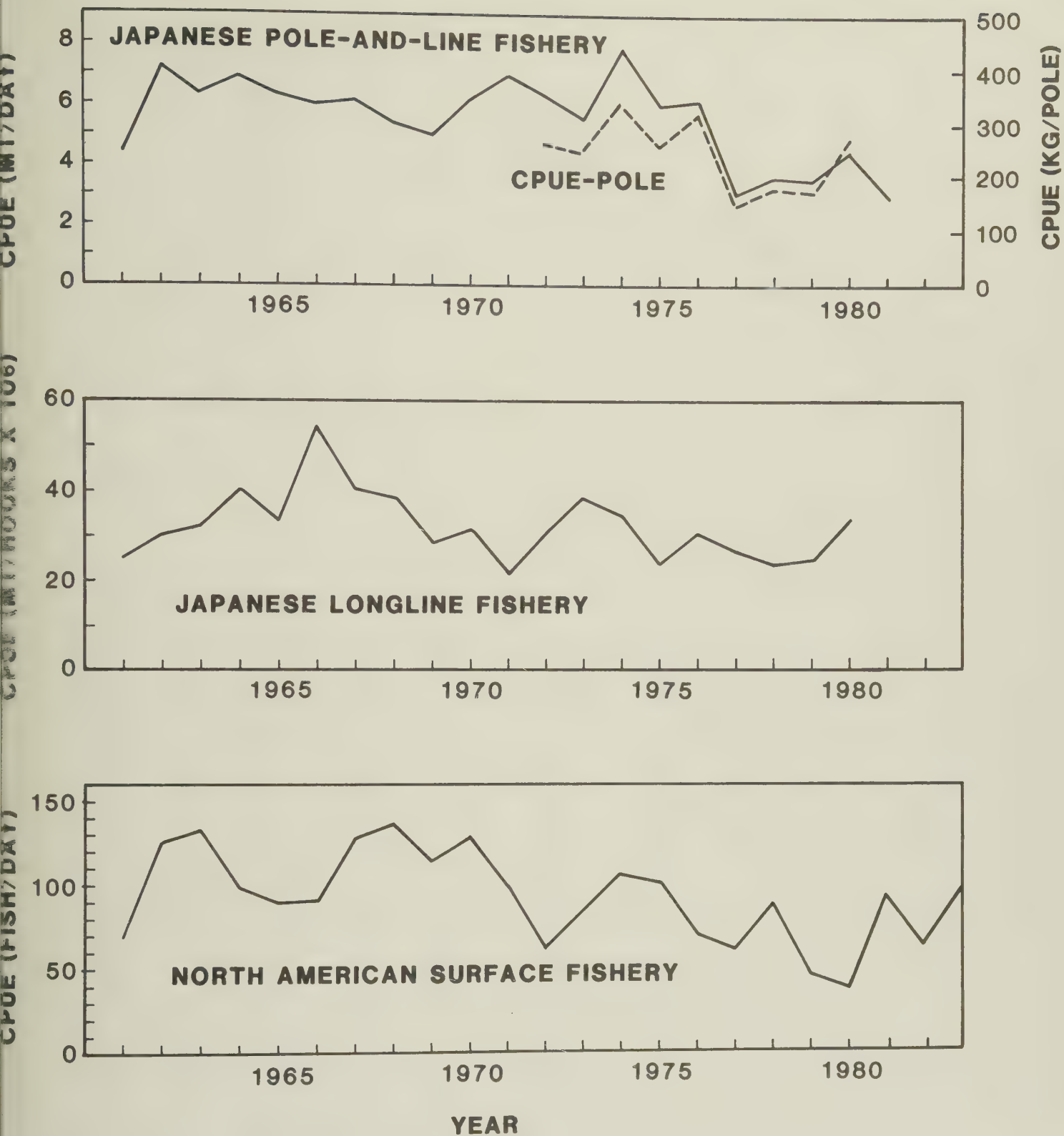


Figure 5. North Pacific albacore catch-per-unit effort (CPUE) by fishery and gear.



Figure 6a. Jigboat catch-per-standard day fishing by 1-degree square area and half-month, April 16-30, 1983.

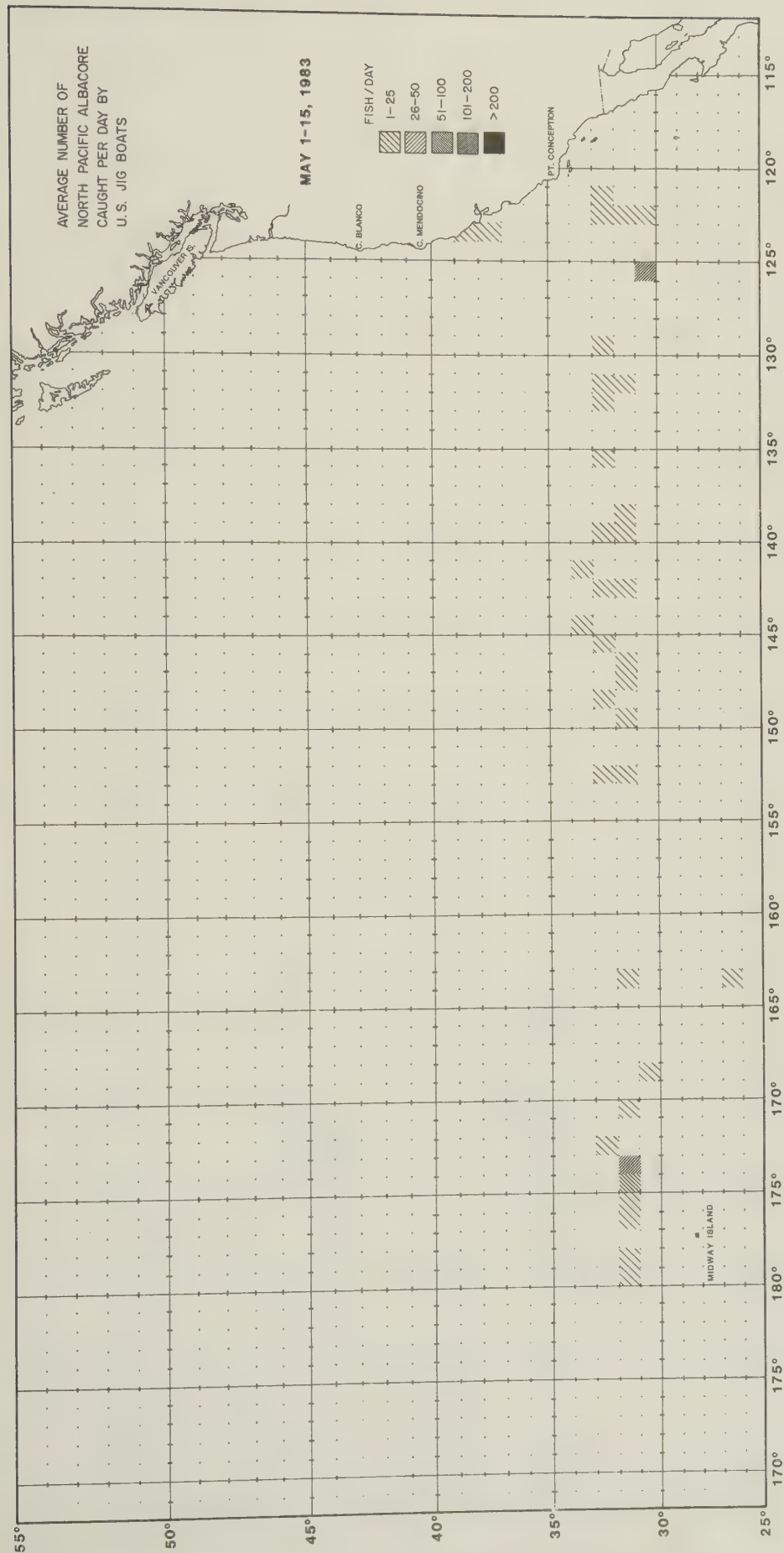


Figure 6b. Jigboat catch-per-standard day fishing by 1-degree square area and half-month, May 1-15, 1983.

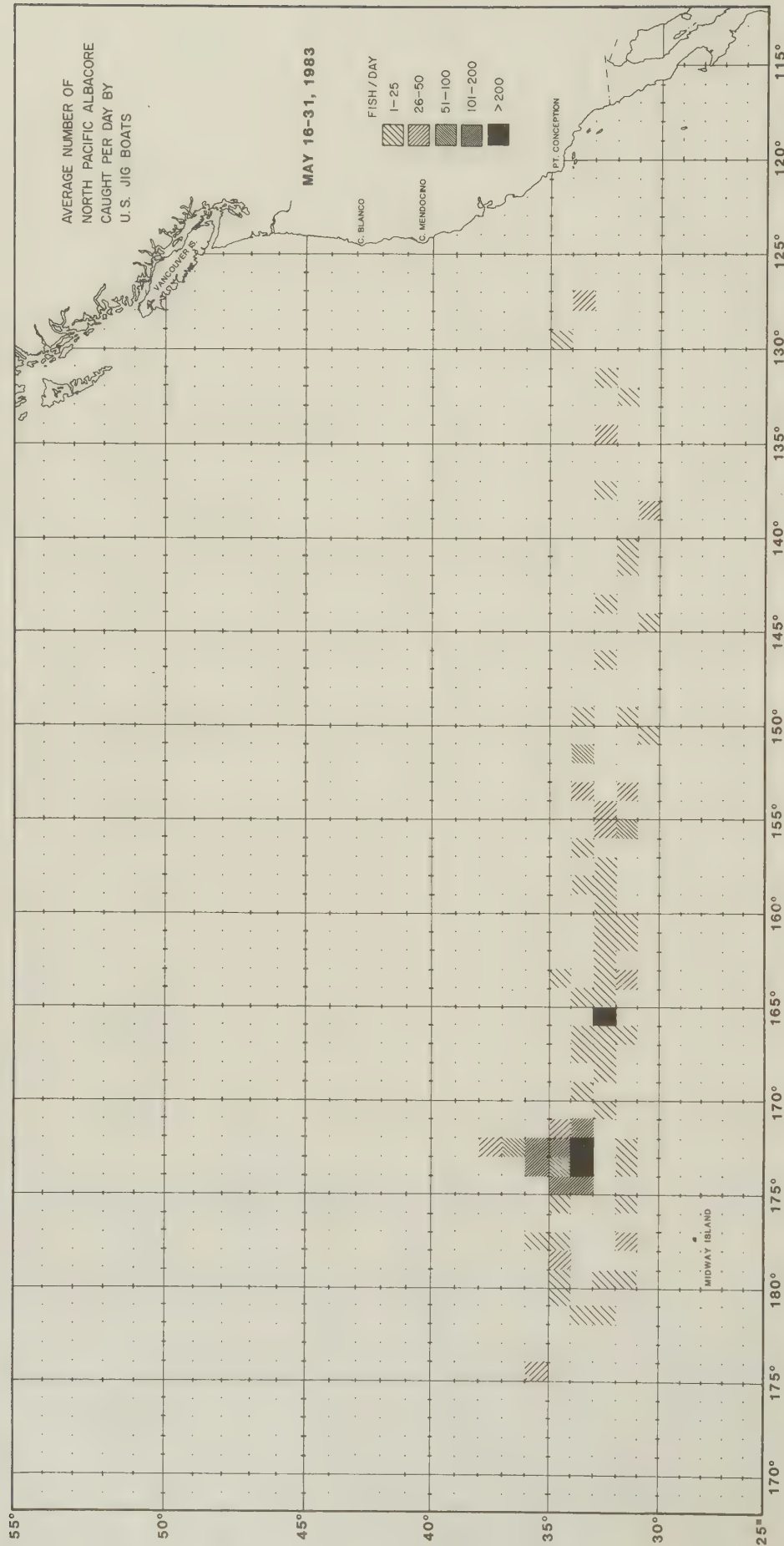


Figure 6c. Jigboat catch-per-standard day fishing by 1-degree square area and half-month, May 16-31, 1983.

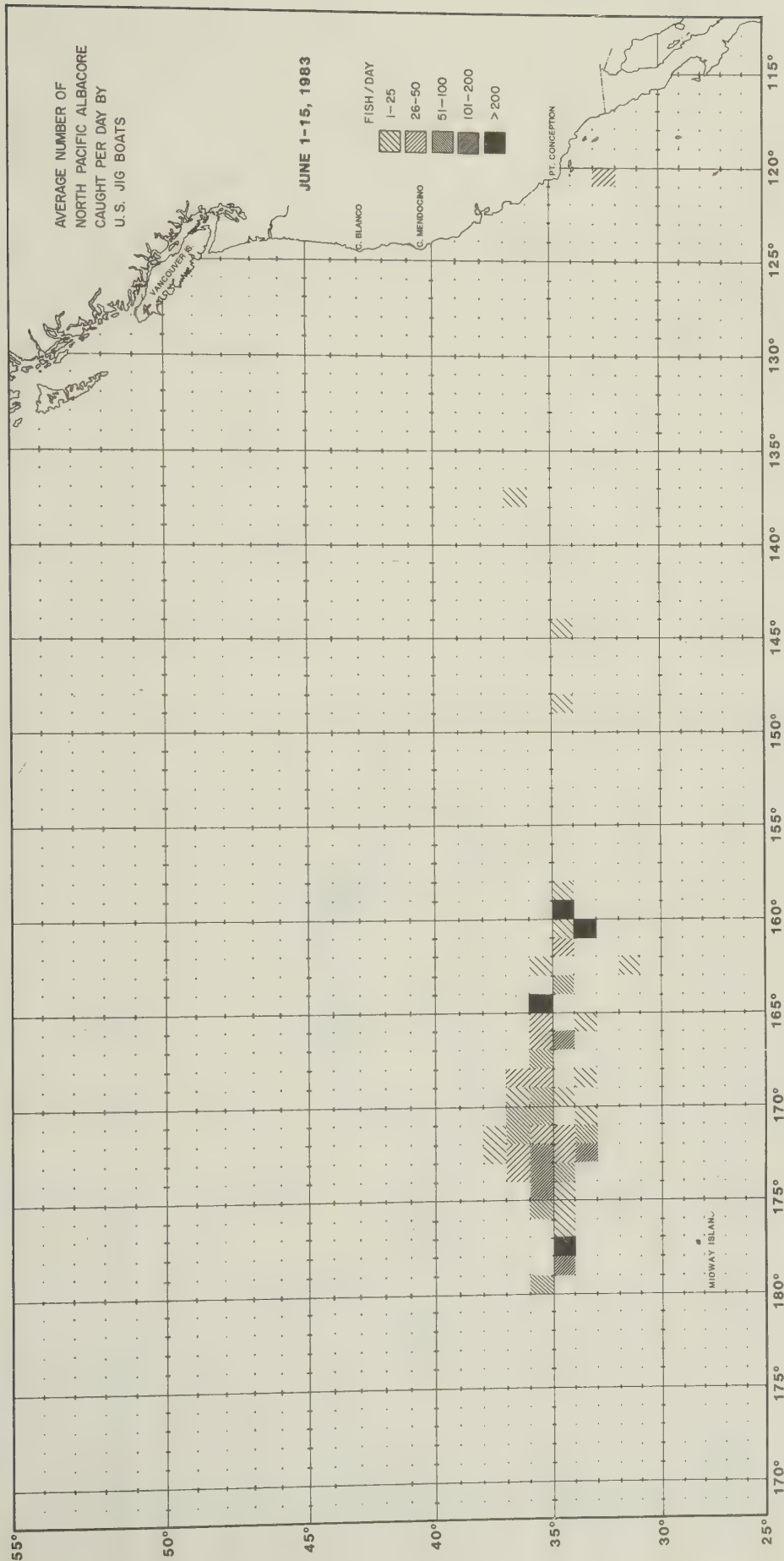


Figure 6d. Jigboat catch-per-standard day fishing by 1-degree square area and half-month, June 1-15, 1983.

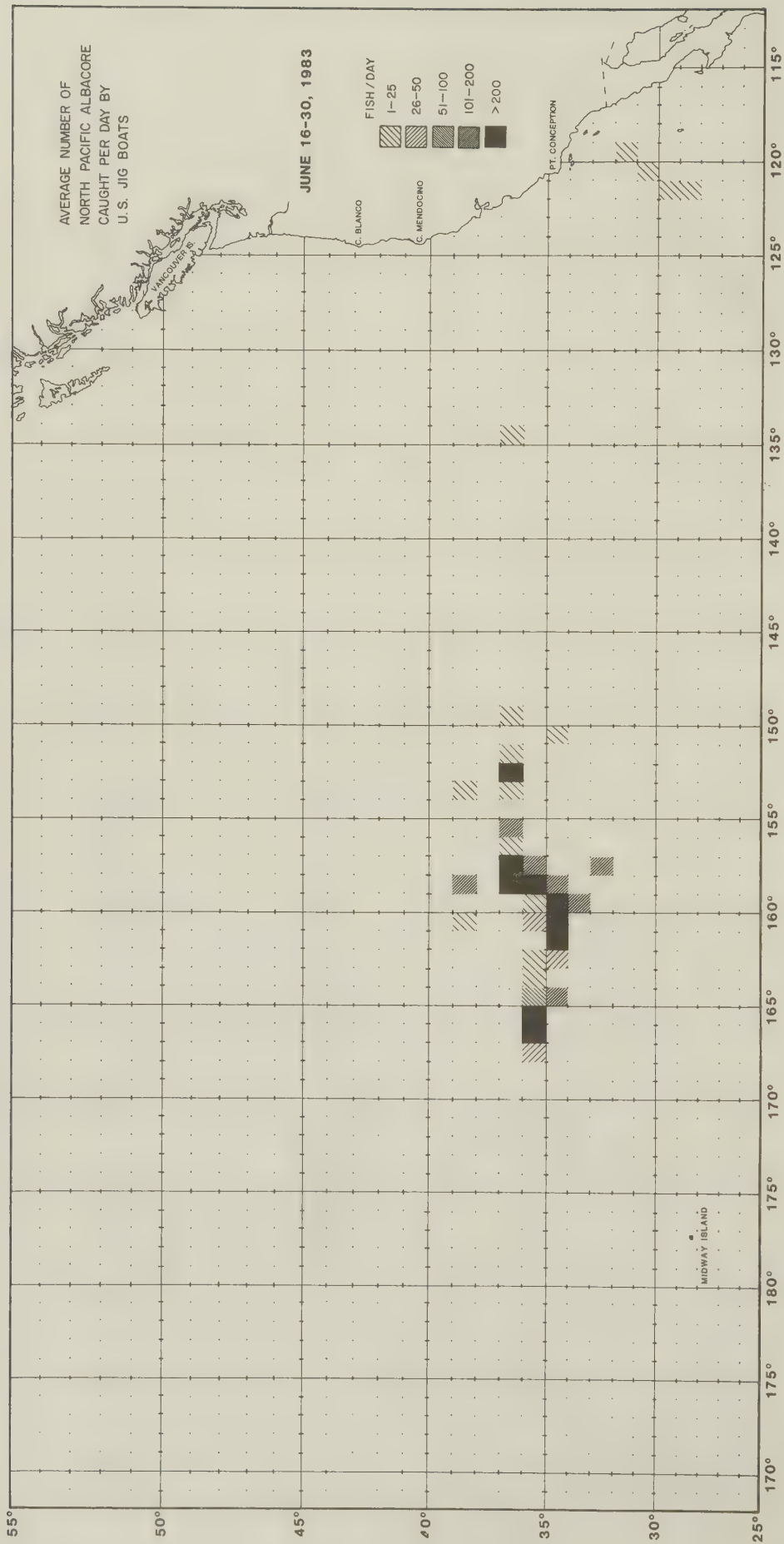


Figure 6e. Jigboat catch-per-standard day fishing by 1-degree square area and half-month, June 16-30, 1983.

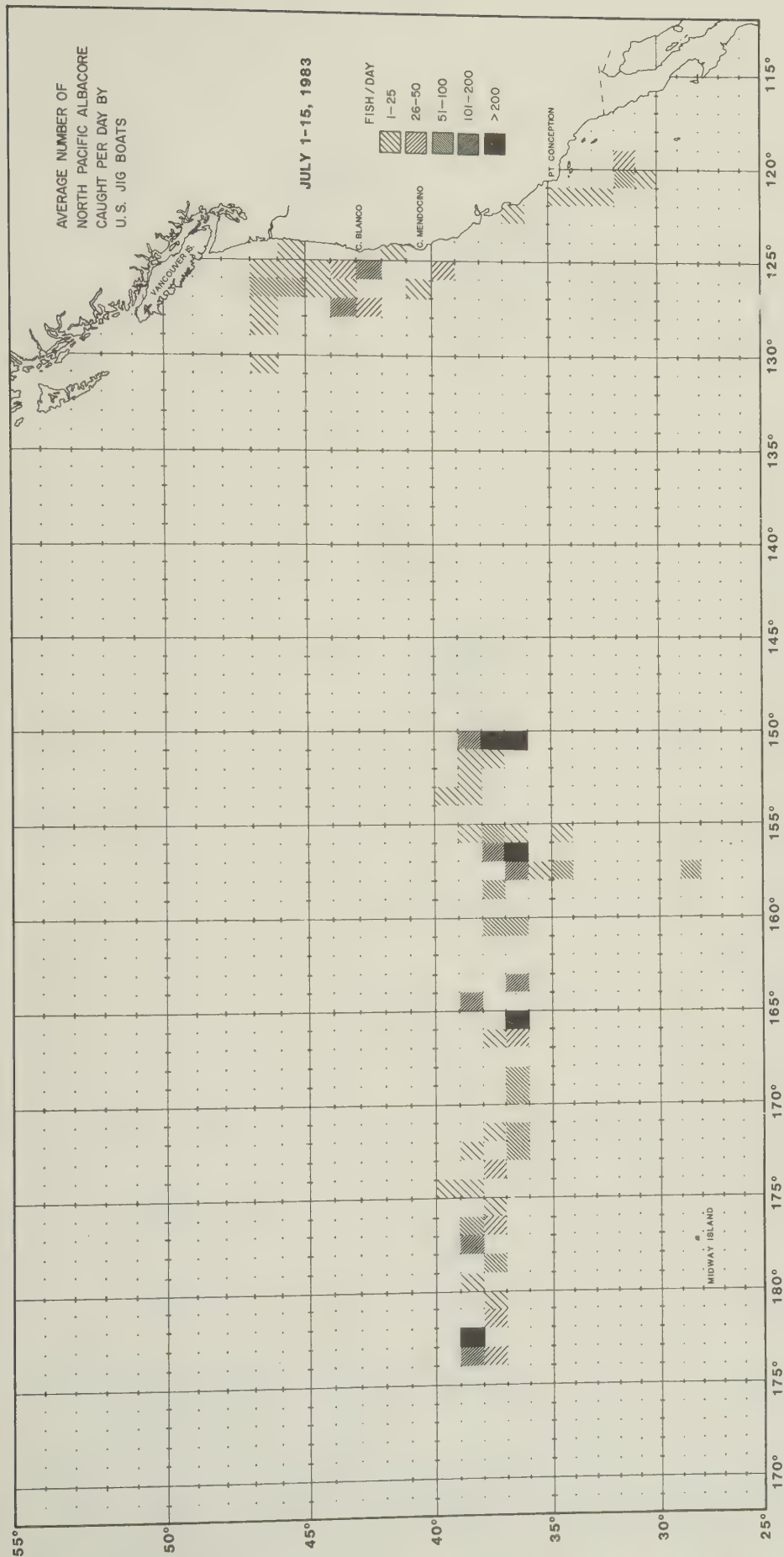


Figure 6f. Jigboat catch-per-standard day fishing by 1-degree square area and half-month, July 1-15, 1983.

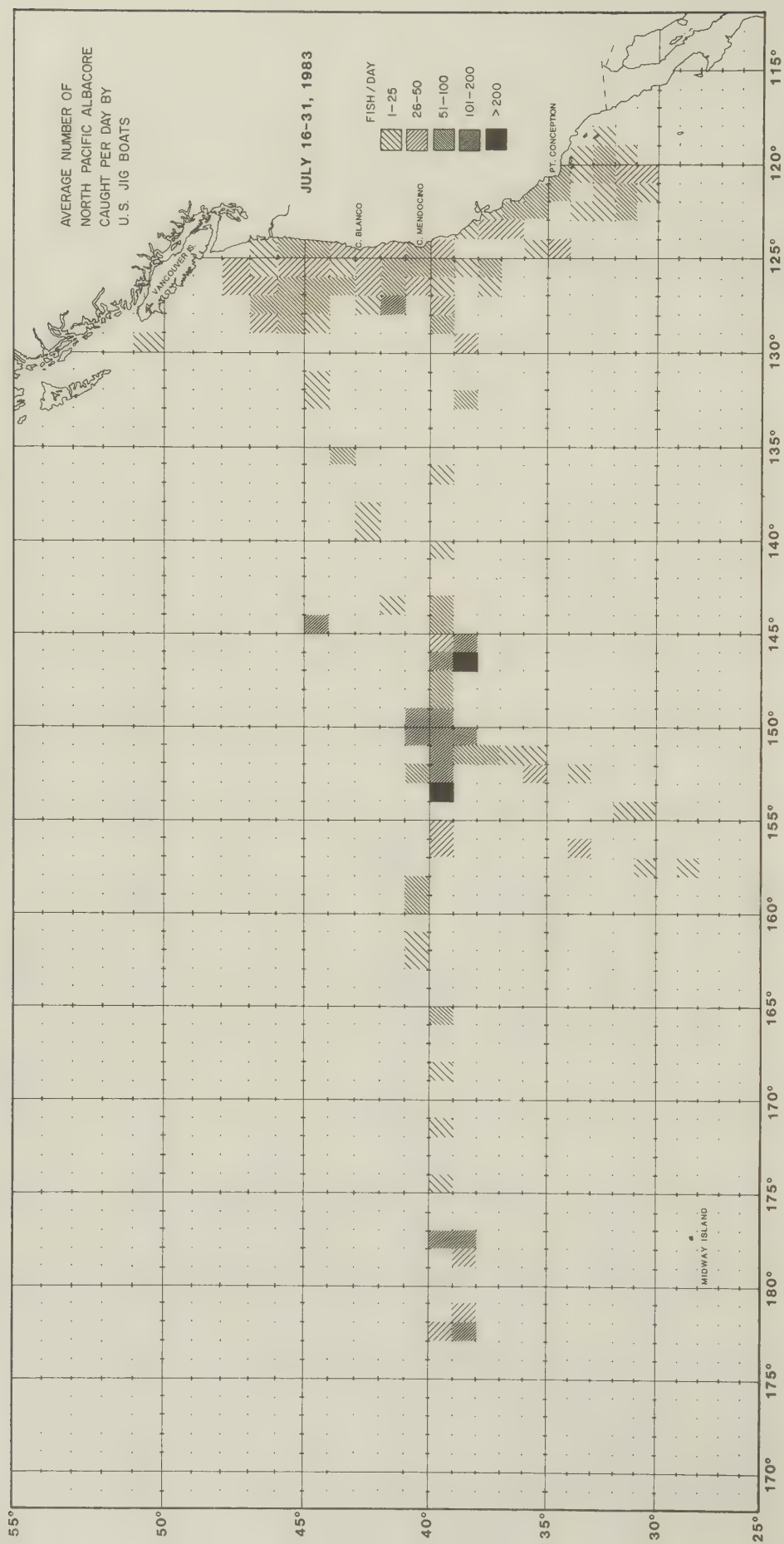


Figure 6g. Jigboat catch-per-standard day fishing by 1-degree square area and half-month, July 16-31, 1983.

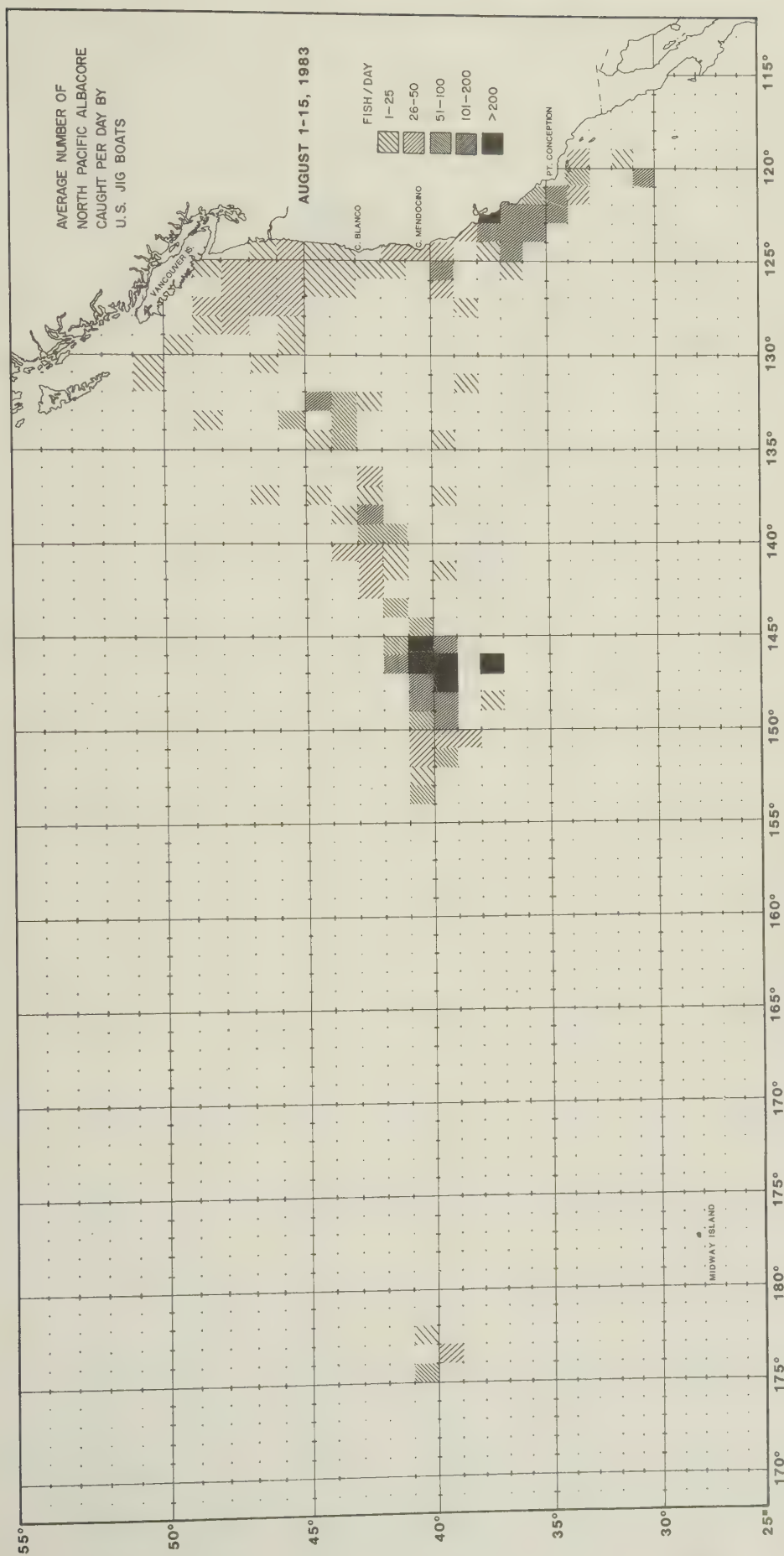


Figure 6h. Jigboat catch-per-standard day fishing by 1-degree square area and half-month, August 1-15, 1983.

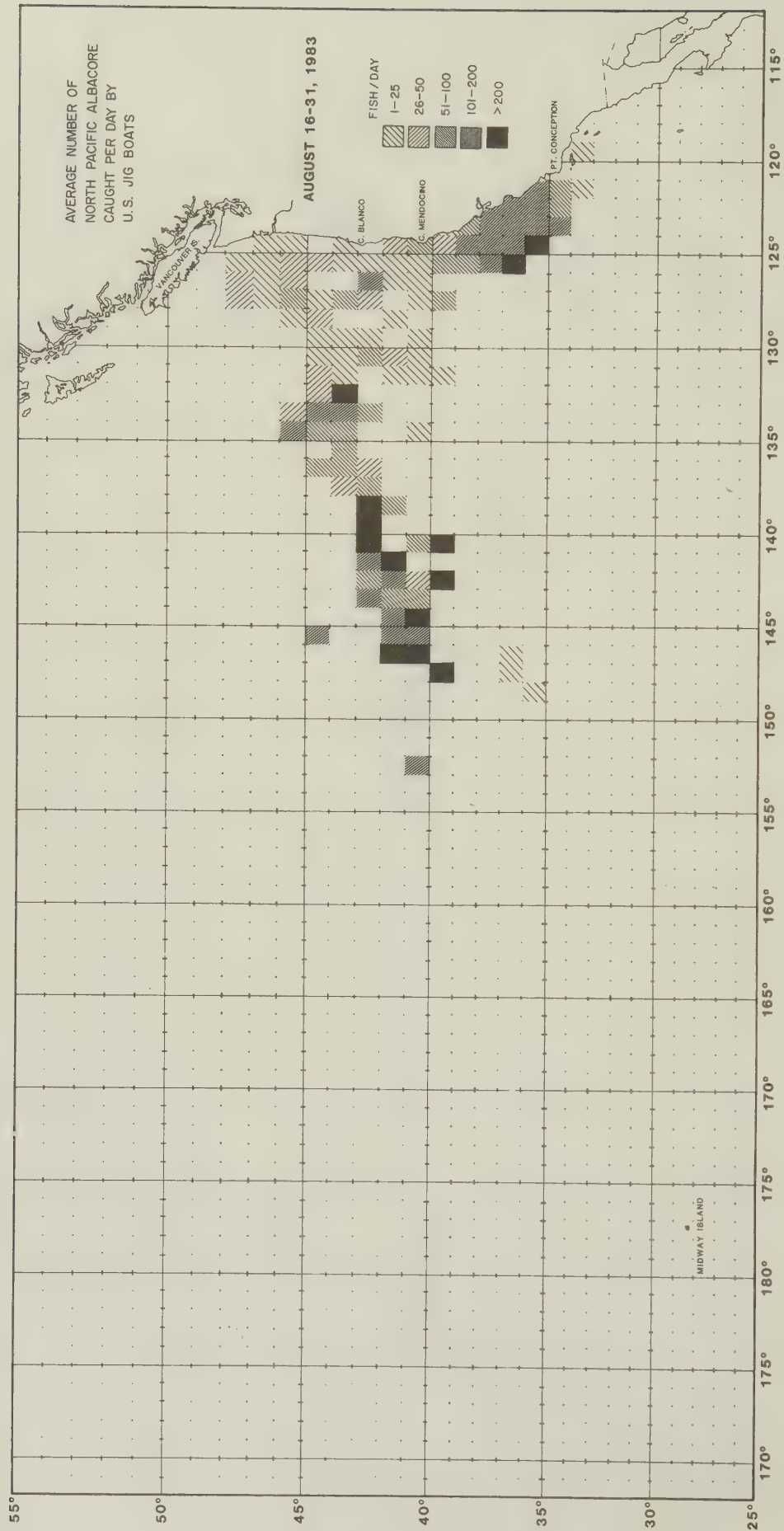


Figure 6i. Jigboat catch-per-standard day fishing by 1-degree square area and half-month, August 16-31, 1983.

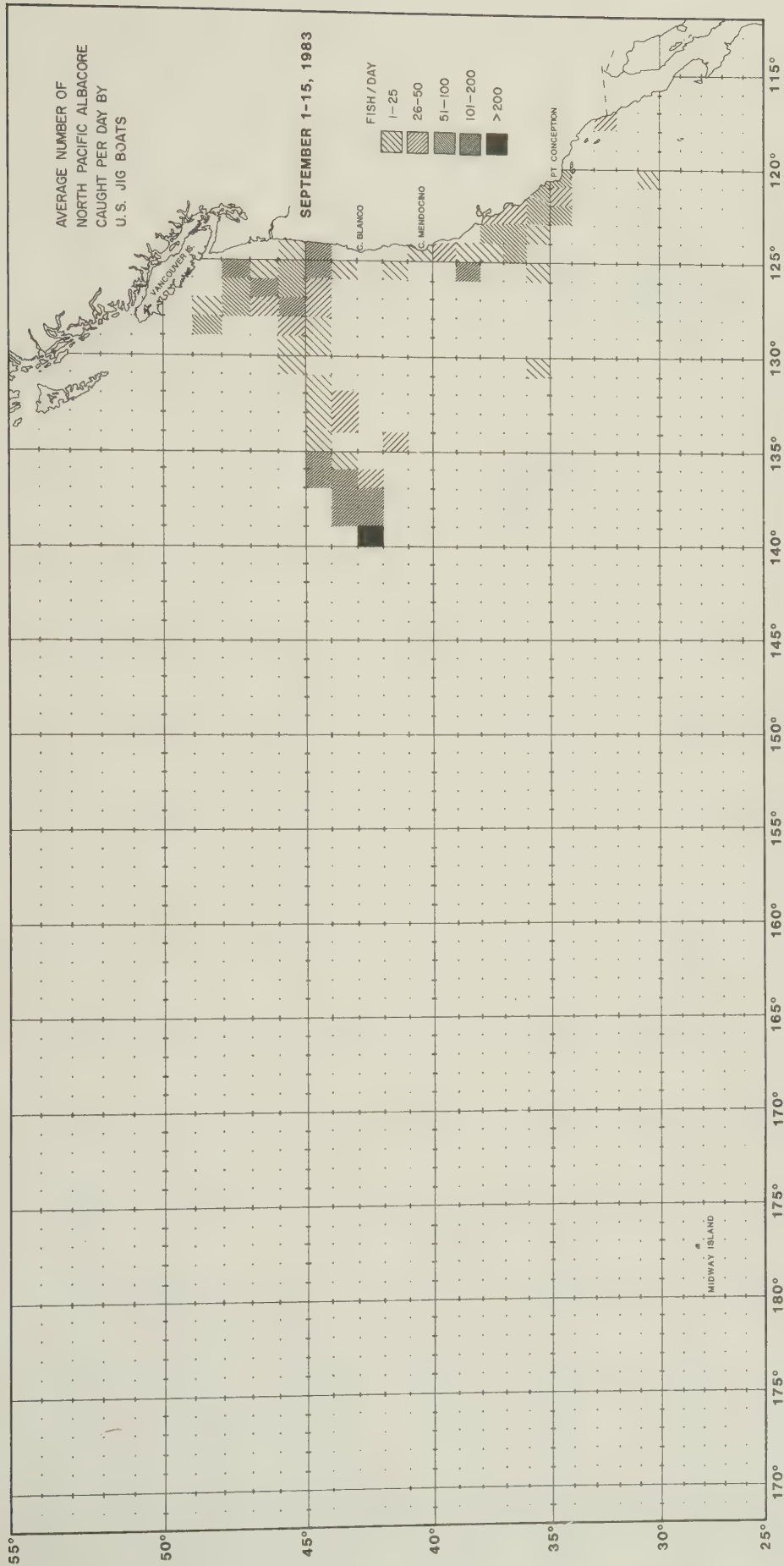


Figure 6j. Jigboat catch-per-standard day fishing by 1-degree square area and half-month, September 1-15, 1983.

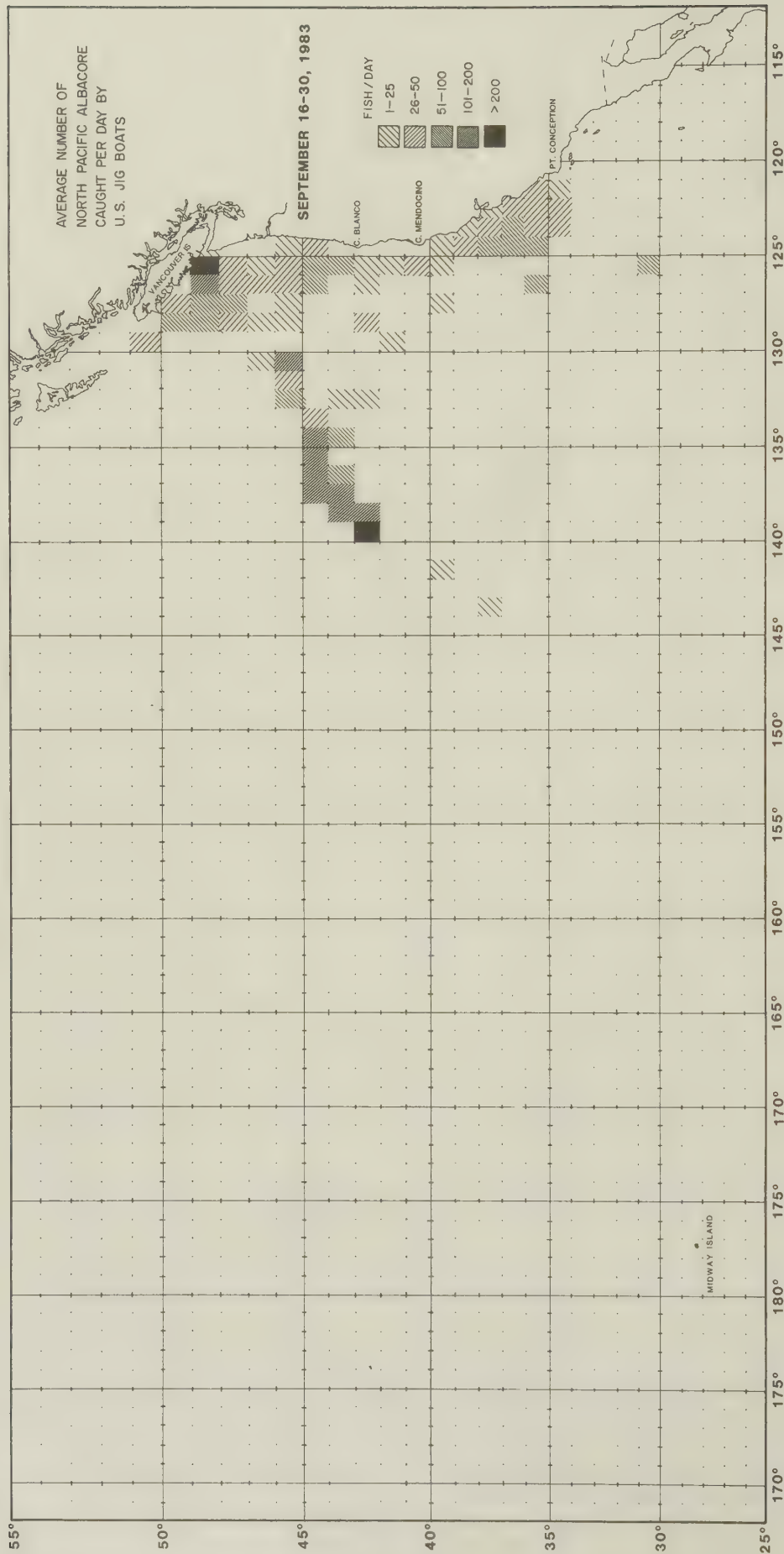


Figure 6k. Jigboat catch-per-standard day fishing by 1-degree square area and half-month, September 16-30, 1983.

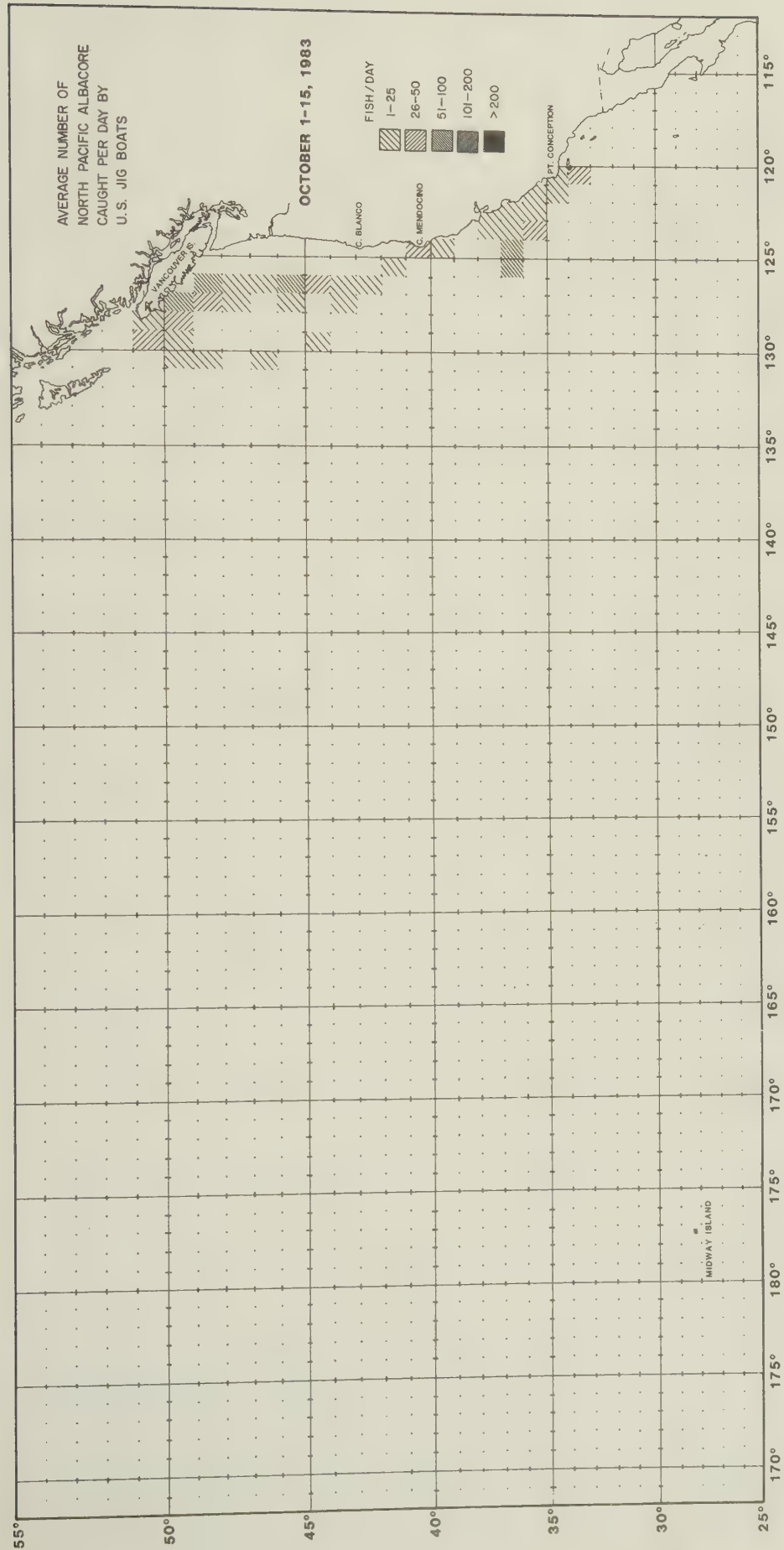


Figure 61. Jigboat catch-per-standard day fishing by 1-degree square area and half-month, October 1-15, 1983.

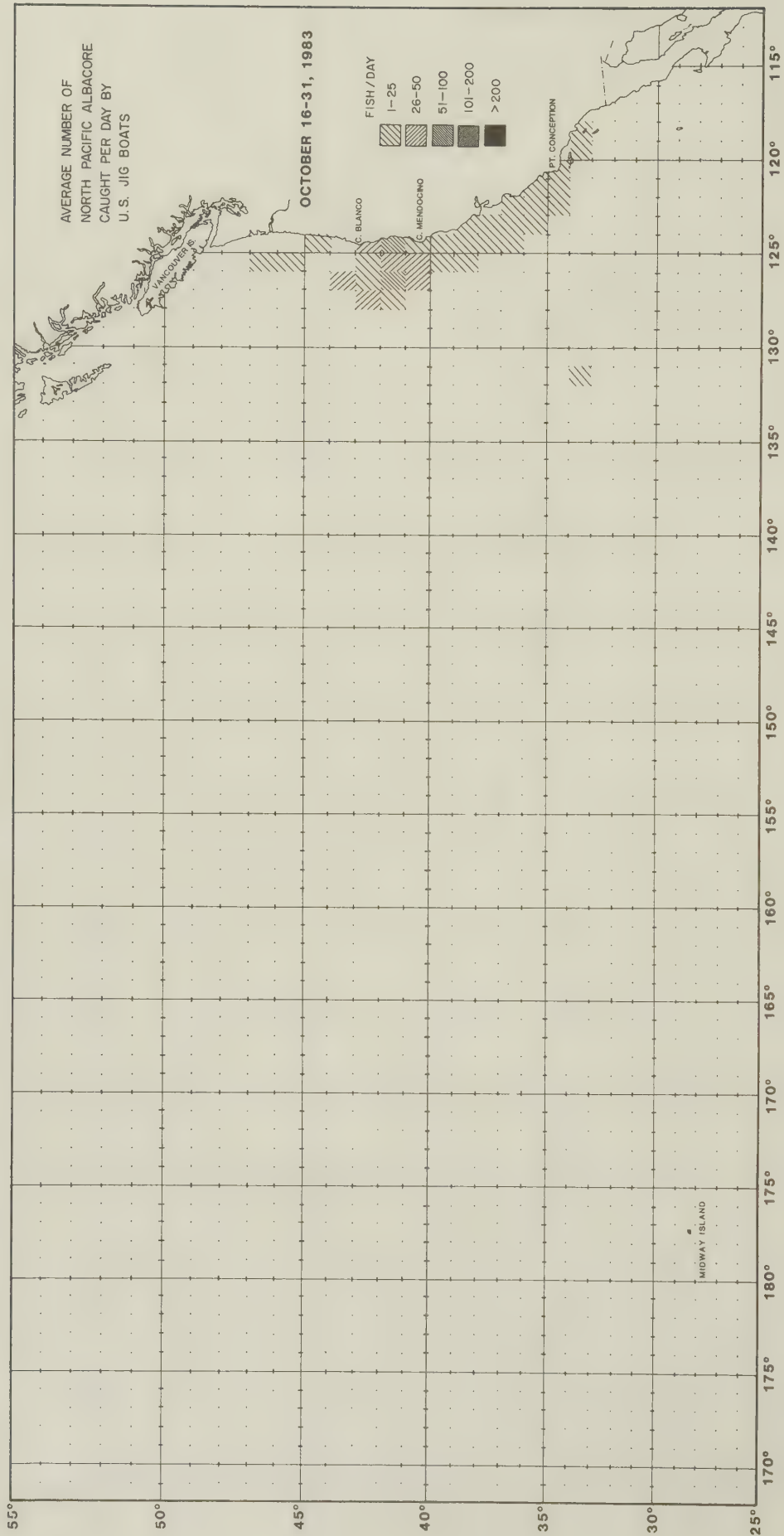


Figure 6m. Jigboat catch-per-standard day fishing by 1-degree square area and half-month, October 16-31, 1983.

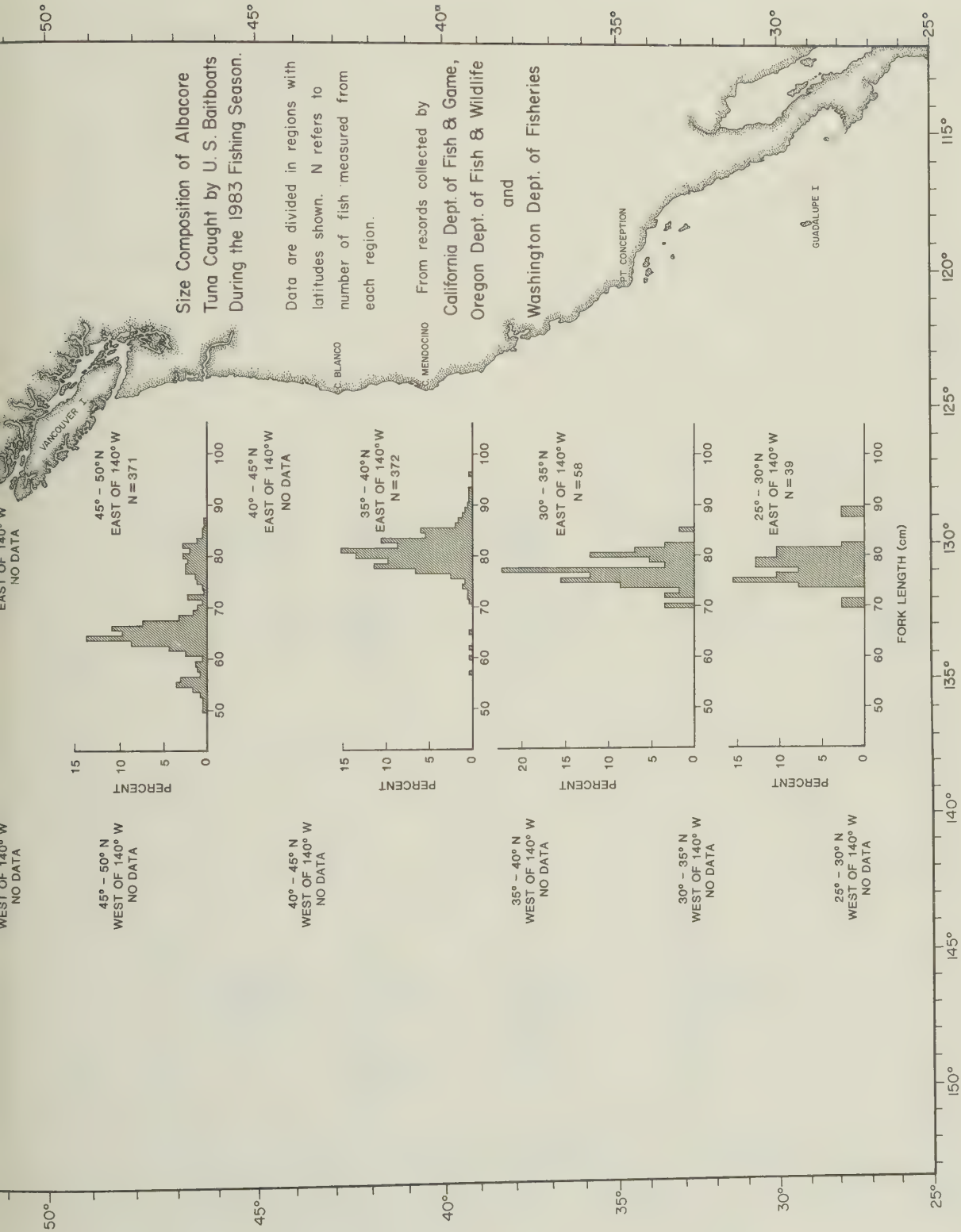


Figure 7a. Length-frequency histograms of 1983 North Pacific albacore caught by U.S. baitboat fishery.

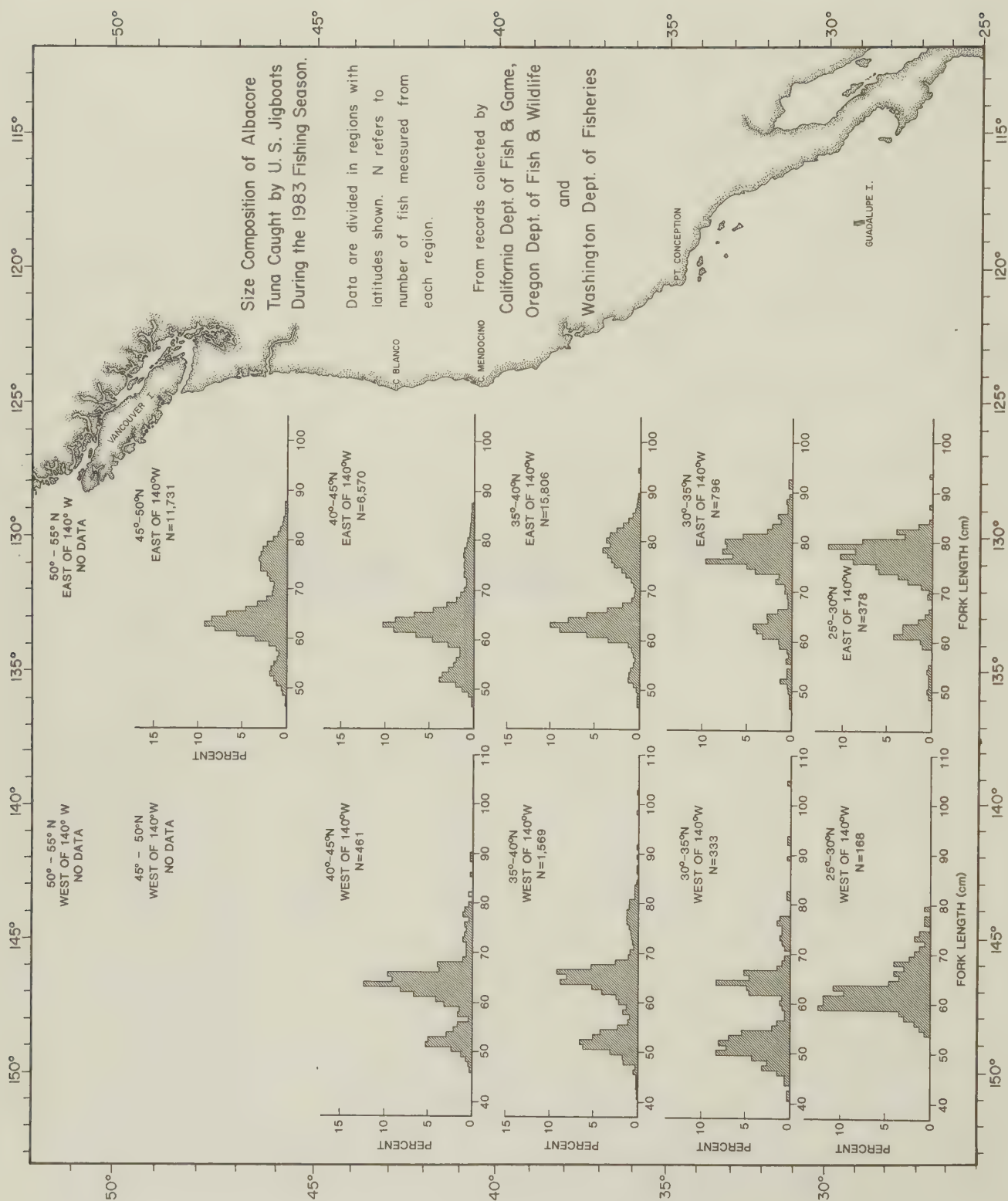


Figure 7b. Length-frequency histograms of 1983 North Pacific albacore caught by U.S. jigboat fishery.

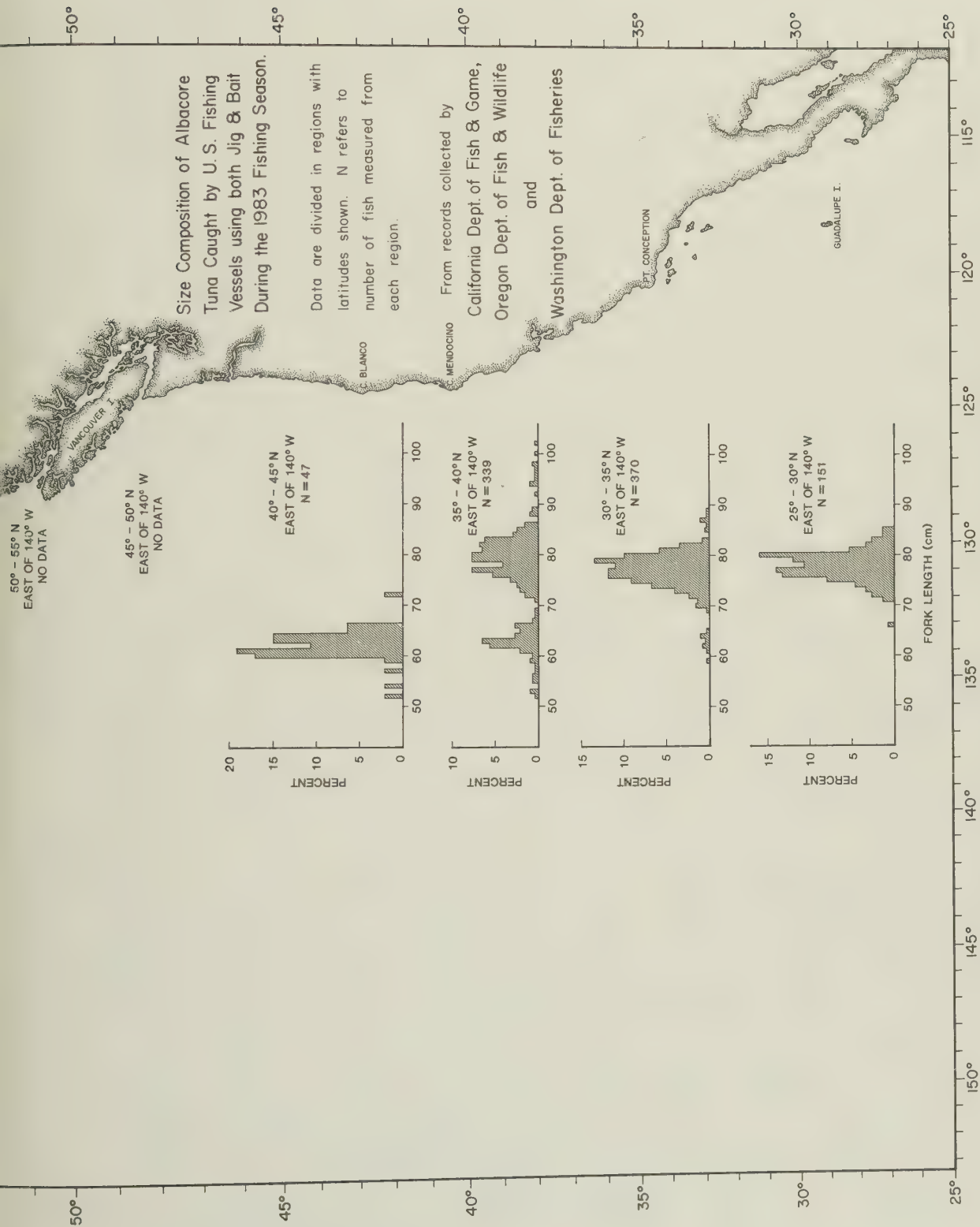


Figure 7c. Length-frequency histograms of 1983 North Pacific albacore caught by U.S. vessels using both bait and jig.

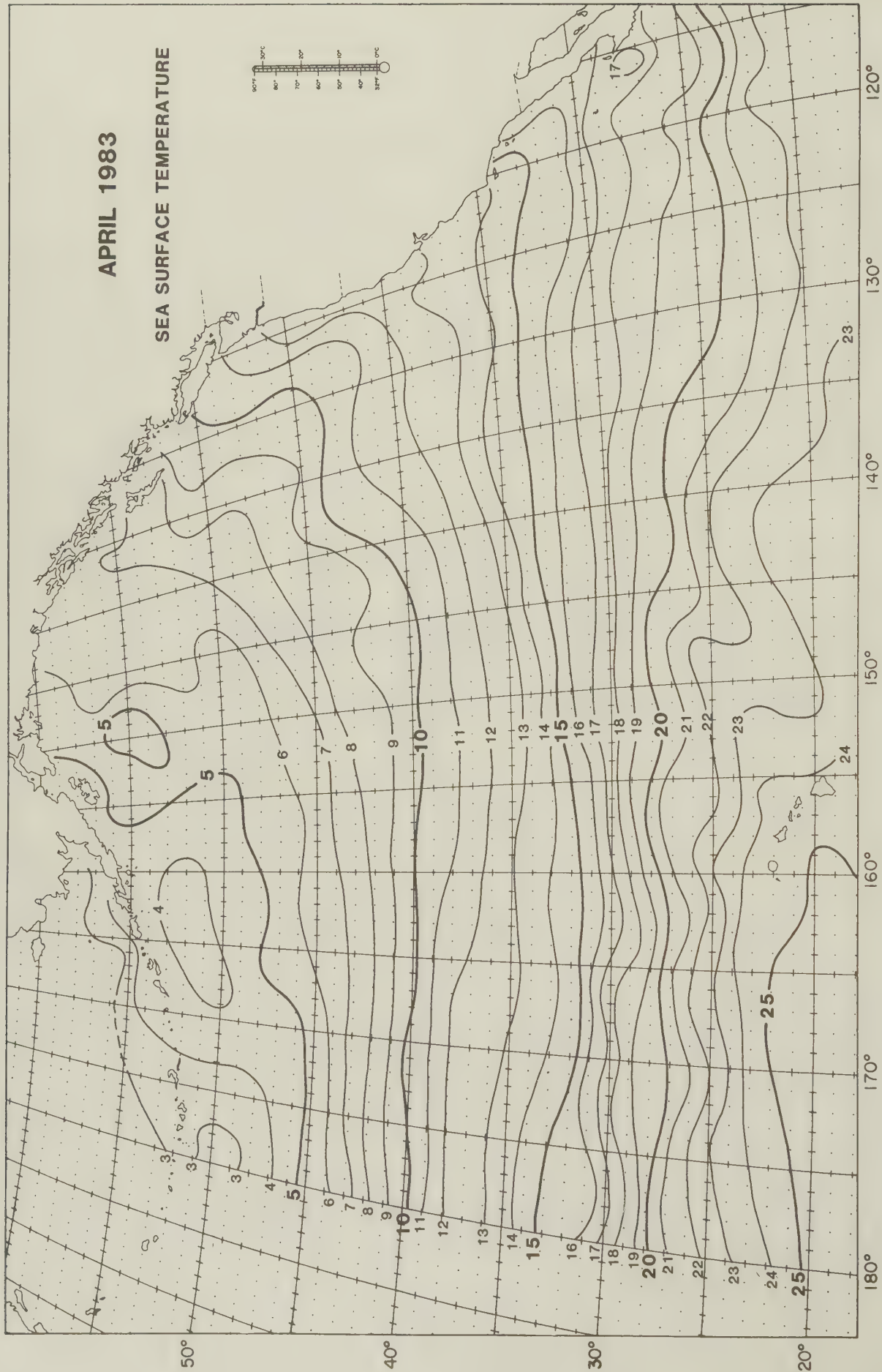


Figure 8a. Average sea surface temperature isopleths ($^{\circ}\text{C}$) by month for the eastern Pacific Ocean, April 1983.

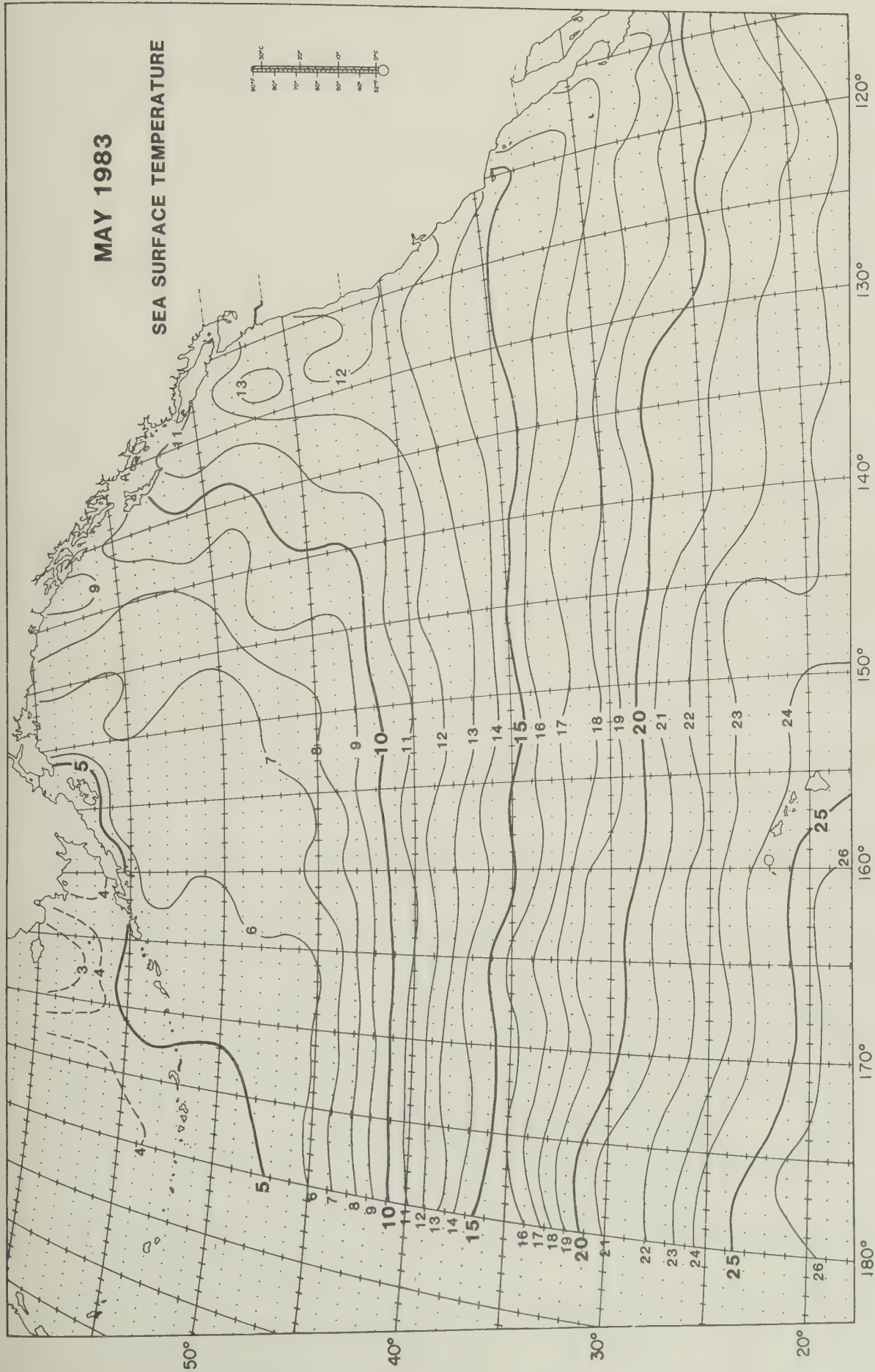


Figure 8b. Average sea surface temperature isopleths ($^{\circ}\text{C}$) by month for the eastern Pacific Ocean, May 1983.

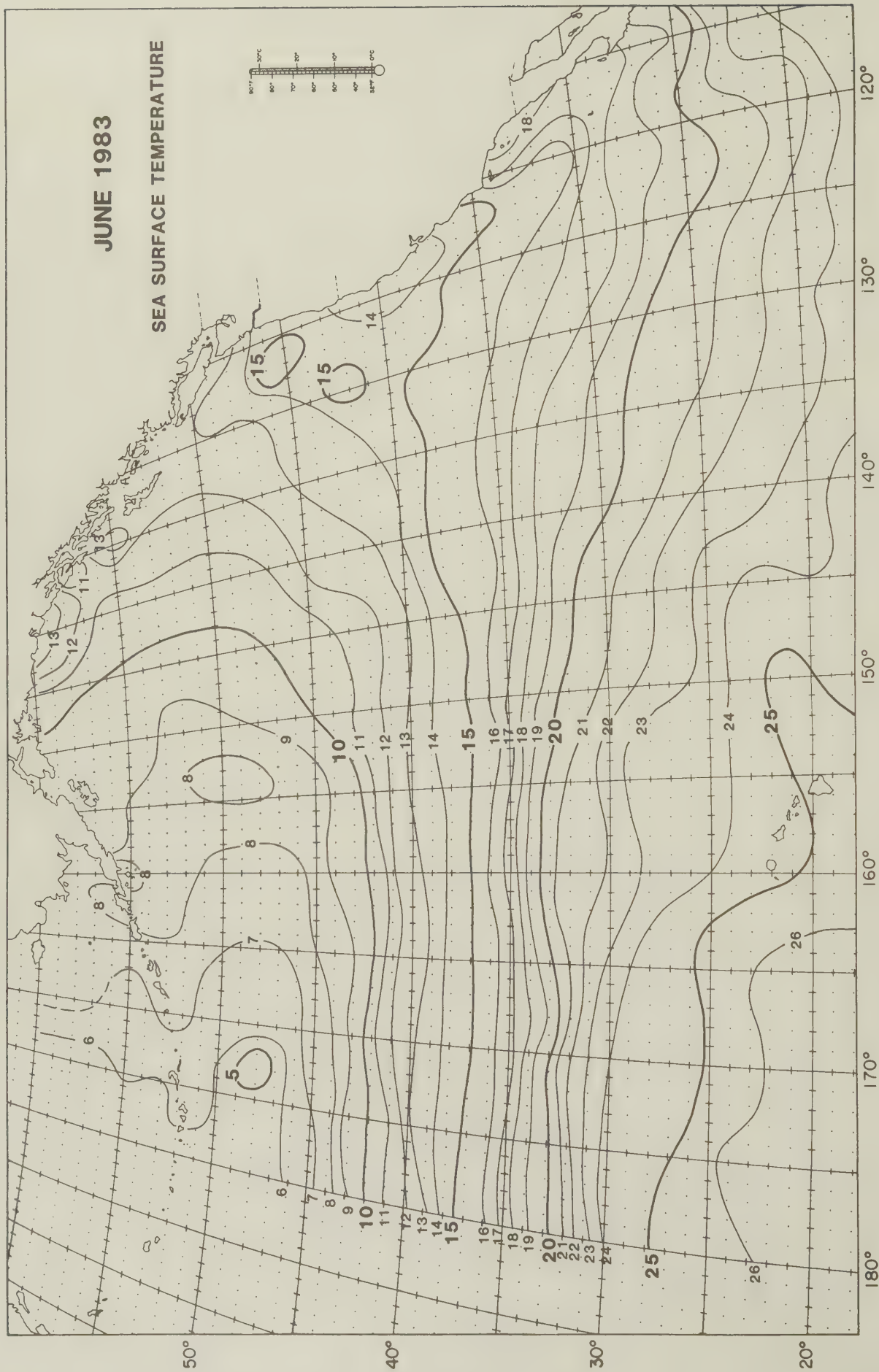


Figure 8c. Average sea surface temperature isopleths ($^{\circ}\text{C}$) by month for the eastern Pacific Ocean, June 1983.

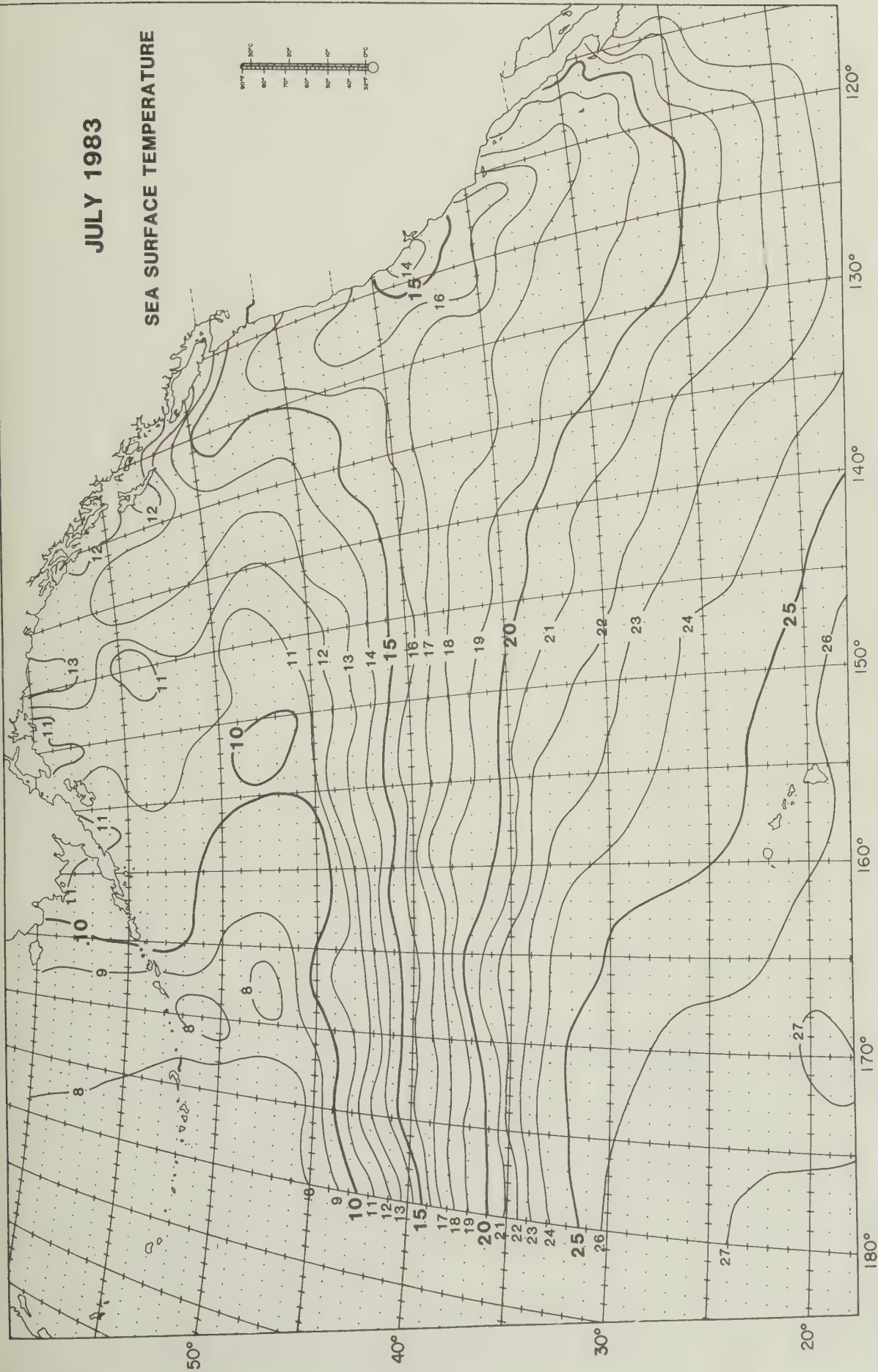


Figure 8d. Average sea surface temperature isopleths ($^{\circ}\text{C}$) by month for the eastern Pacific Ocean, July 1983.

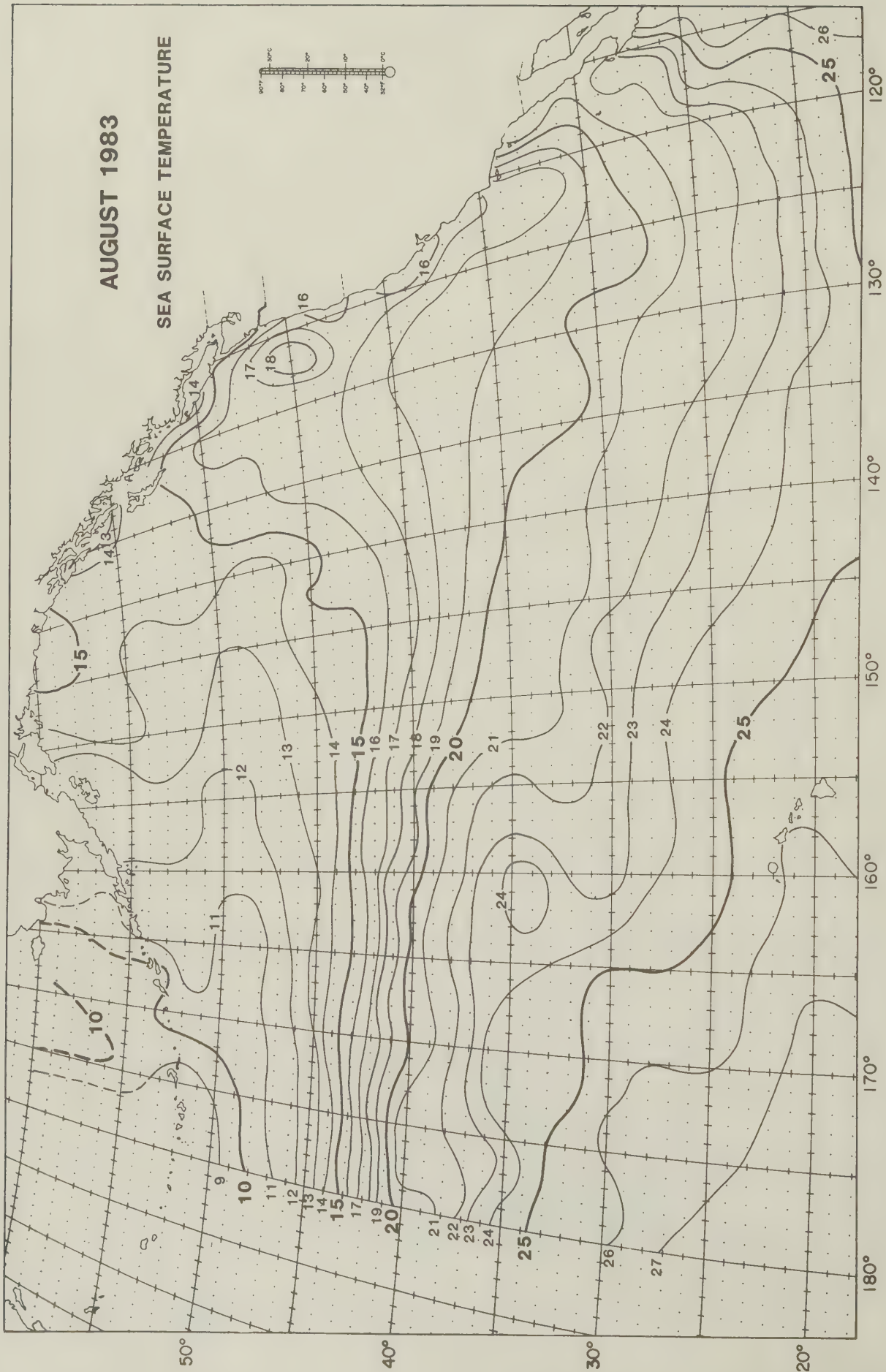


Figure 8e. Average sea surface temperature isopleths ($^{\circ}\text{C}$) by month for the eastern Pacific Ocean, August 1983.

SEPTEMBER 1983

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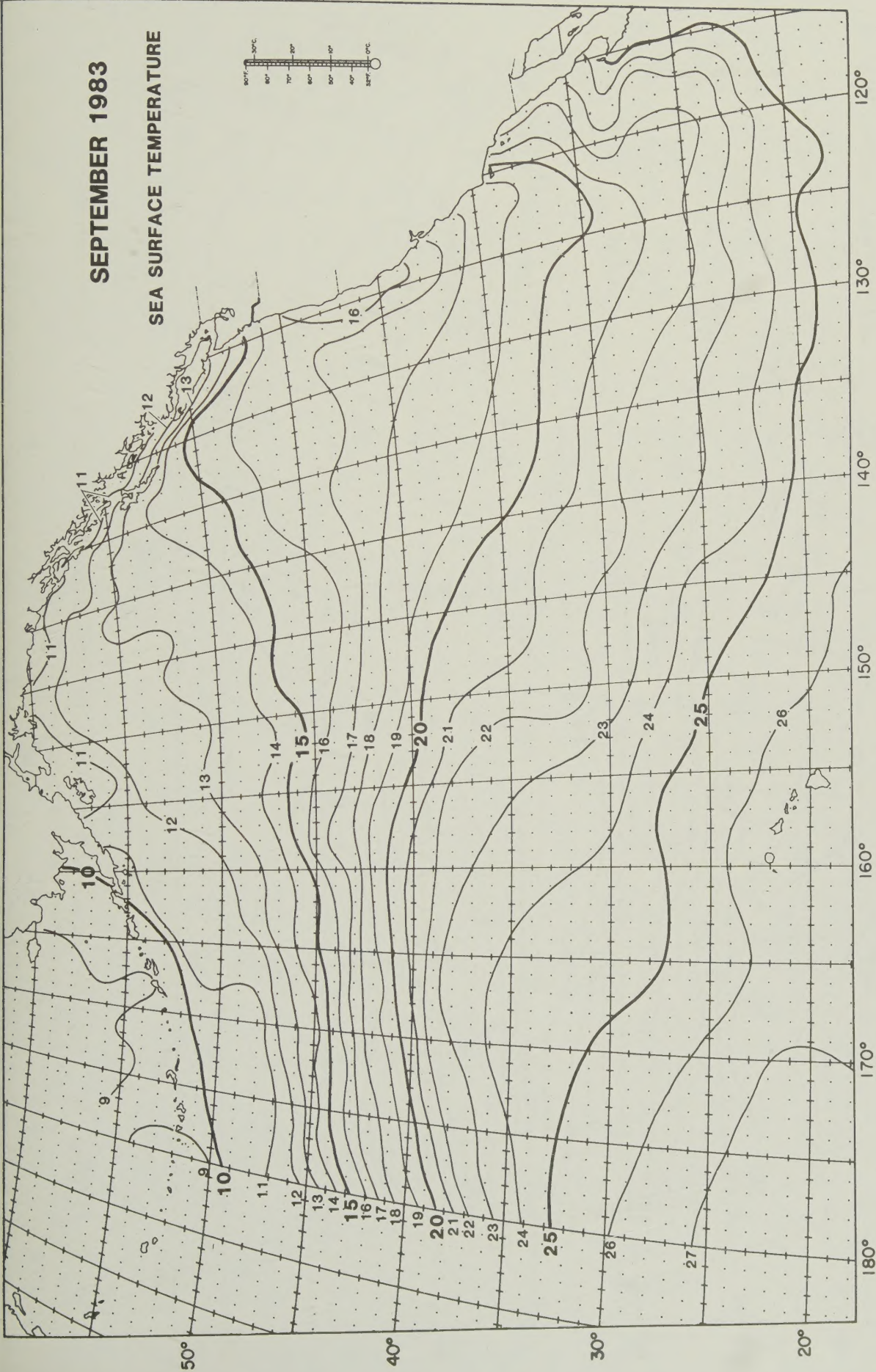
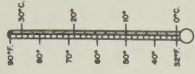


Figure 8f. Average sea surface temperature isopleths ($^{\circ}\text{C}$) by month for the eastern Pacific Ocean, September 1983.

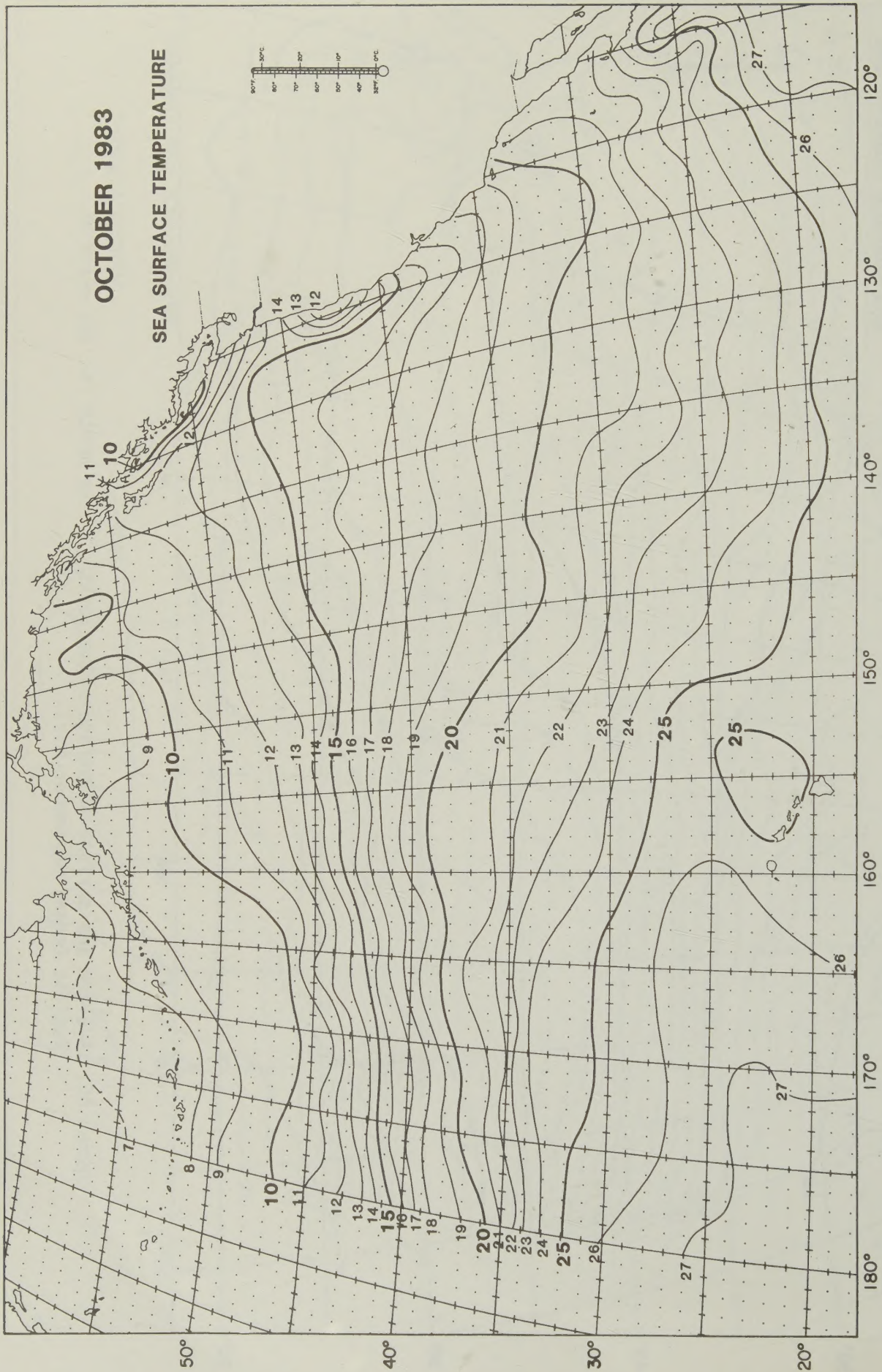


Figure 8g. Average sea surface temperature isopleths ($^{\circ}\text{C}$) by month for the eastern Pacific Ocean, October 1983.

